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The effects of alterations in test procedure upon the original and repeated test performance of normal adolescents are determined for two subtests--Block Design (BD) and Picture Arrangement (PA)--appearing in the Wechsler Intelligence Scale for Children and Wechsler Bellevue Intelligence Scale Form 1. Two experiments were conducted, one with 170 eighth and ninth grade students and the other with 146 seventh and eighth grade students. The first experiment used only the BD subtest, while the second used both the BD and PA subtests. In both experiments an alternative form of the subtest was administered immediately after the first, with help given on the first administration only. The results included: (1) Administering help and giving cues did not affect test performance of the first experiment, but did affect that of the second, (2) different examiners do not obtain significantly different test scores, (3) there is little difference between sexes in the test scores, (4) grades are poor predictors of the BD and PA subtests, and (5) SCAT scales are highly correlated with grades. (HW)

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EFFECTS OF GRADUATED CUES ON PERFORMANCE ON TWO WECHSLER SUBTESTS

Jerome M. Sattler

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San Diego, California 92115

December 1967

The research reported herein was performed pursuant to a grant with the Office of Education, U. S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

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1. Introduction

Problem

The psychological evaluation of a child's abilities is an extremely important task, especially when the child has learning or emotional difficulties. Problem children are usually evaluated by psychological assessment techniques which are individually administered. Group tests are less useful because, for example, it is more difficult to evaluate whether the child is trying his best, or whether directions are clear. Problem children frequently do not work at their maximum capacity, and group testing procedures do not provide methods for controlling or enhancing motivational level. Intellectual assessment, usually a part of the evaluation procedure, is performed by using one of a number of available individually administered intelligence tests such as the Stanford-Binet (S-B) or Wechsler Intelligence Scale for Children (WISC). These tests require strict adherence to standardized procedures in order to ensure reliable and valid results. However, in many cases the child's physical, psychological, or cultural handicaps may impede the examiner's ability to administer the tests according to strict administrative procedures.

Children with emotional blocks, bilingualism, and physical difficulties such as cerebral palsy, deafness, blindness, or organic brain damage, usually perform less adequately on many tests. Their lowered performance may be due in part to their inability to comply with the task demands, rather than to a lack of knowledge per se. Thus, some children may be able to solve a problem if given more time, more explicit instructions, more trials, more help in understanding the task demands, or if they are permitted to answer the problem using more efficient sensory modalities. Little is known, however, about how emotional and physical difficulties affect performance on various test items, or about the effects of alterations in administrative test procedures on test performance.

While it is important to study emotionally disturbed and physically handicapped groups, the performance of normal children under experimental procedures designed to investigate the effects of modifying standard procedures should be studied prior to investigating disturbed groups. Data derived from normal groups can then be used for comparison purposes.

The problem of the present investigation is to determine the effects of alterations in test procedure upon the original and repeated test performance of normal adolescents. Specifically, the effects of graduated help steps on two Wechsler subtests, Picture Arrangement (PA) and Block Design (BD), are investigated. The results of the investigation provide data concerned with (a) help steps and test performance; (b) test performance and school grades; (c) examiner differences in obtaining test scores; and (d) the relationship between School and College Ability Test (SCAT) scores and other variables used in the investigation.

Background and Review of Related Research[1]

Masling (1960), in reviewing the situational and interpersonal variables in projective testing, concluded that such variables significantly affect test results. Because similar variables occur in the area of intelligence testing, it is important to evaluate the extent to which they also affect intelligence test scores. The studies and suggestions made by test authors and writers appearing in this area are reviewed and organized by generally following the categories utilized by Masling (1960), namely: departures from standard procedures, situational variables, examiner variables, and subject variables. Experiments using group administration are not reviewed; rather, the focus is on experiments employing one subject at a time.

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[1] This section, with the exception of a few references, will appear under the title "Procedural, Situational, and Interpersonal Variables in Individual Intelligence Testing" in the *Psychological Bulletin*. Also see Footnote 6, page 26.

Departures from Standard Procedures

Numerous writers (e.g., Cronbach, 1960; Freeman, 1962; Terman & Merrill, 1960; Wechsler, 1949) emphasize the importance of following standard procedures in administering individual intelligence tests. According to Terman and Merrill (1960), "The discipline of the laboratory has furnished the training ground for instilling respect for standard procedures [p. 47]." Cronbach (1960), in discussing adherence to standard instructions, notes: "Any departure from standard administrative practice changes the meaning of scores [p. 185]." Wechsler (1949) indicates that instructions and questions must be read exactly as written in the test manual. However, research on the effects of departing from standard procedures is scant and the results are only suggestive.

In requiring standard test procedures the test authors do not take into account subject variations or the possibility that a more accurate estimate of intellectual ability can be obtained, on some occasions, by "violation" of standard procedures. The examiner who deems it desirable to go beyond the standard test instructions in order to assess present or potential intellectual ability has usually read that such procedures may interfere with or affect the final test results. Freeman (1962) recognized that extratesting procedures are desirable when the examiner wishes to evaluate additional facets of the subject's abilities. However, he pointed out that such procedures should be attempted after the formal testing has been completed in order to maintain standardized procedures.

Modifications in test procedure have been suggested, especially when evaluating exceptional subjects. A rationale for test modifications is offered by Schonell (1956): When subject's responses are "adversely affected because of his physical or sensory handicap, it seems reasonable to modify the administration and/or scoring of the test, if no other test is suitable for the particular individual [p. 40]." In another article (Schonell, 1958) she writes: "while all precautions should be taken to adhere as closely as possible to test instructions, occasions arise with some badly handicapped children when a pedantic adherence to the instructions will produce a result not only unfair to the individual but quite incorrect and misleading /p. 137/." Wells and Ruesch (1945) suggested that when administering the Wechsler-Bellevue Intelligence Scale (WB) "phraseology may be modified so long as essential content is unchanged /p. 143/." It is permissible, they suggest, to allow subjects who are hard of hearing or who are very bright to see the problems. Kessler (1966) recognized that the testing of blind and deaf subjects poses a particular problem: "Standard intelligence tests have to be modified to allow for the lack of sight or hearing, and it is questionable how far they can be changed and still be comparable to conventional test results /p. 344/."

Newland (1963) suggested that a number of alternatives are available to the examiner in making test adaptations: "the examiner may read the standardized test items to blind subjects, may allow a child to use a typewriter in giving his responses if he has a major speech or handwriting problem, may observe the eye movements of the subject as he identifies parts of a test item (where other children might write or point with their fingers in responding), might start with motor items rather than with verbal items in the case of a child whose problem involves the communication area, or might even rearrange some Binet items into WISC /Wechsler Intelligence Scale for Children/ form if research warranted taking such liberties with the material /p. 69/."

Eisenson (1954) also recommended that on some occasions the examiner should not stay within the confines of the standard administrative procedures. He suggested, for example, that standardized tests administered to aphasic patients, "should be used to aid in formulating clinical judgments rather than as a means of trying to get a quantitative index . . . . Modifications in administering the tests and of evaluating the responses are usually necessary, or at least desirable, in order to elicit the clearest picture of the patient's intellectual functioning. Time limits may be ignored and roundabout definitions accepted /p. 4/." Such modifications, he recognized, preclude the use of test norms.

Multiple-choice administration of the Picture vocabulary test of the Stanford-Binet Intelligence Scale (S-B) is criticized by Burgemeister (1962). By suggesting things to the subject "the test item is admittedly less difficult for not requiring recognition and recall elements of the Stanford presentation. Credit thus given is, of course, distorting scores in favor of the cerebral-palsied patient /p. 117/."

Rephrasing WISC questions has been recommended recently. Eisenman and McBride (1964) suggested that some rural subjects may be penalized if the wording of the "balls" Comprehension item is used. Coyle (1965) suggested that the COD Information item be rephrased, in some cases, in order to avoid loss of rapport and an underestimation of the subject's potential.

Burgemeister (1962), Coyle (1965), Eisenman and McBride (1964), Eisenson (1954), Kessler (1966), Newland (1963), and Wells and Ruesch (1945) offered no data to indicate how modifications may affect the reliability or validity of the test results. These writers recognized that modifications may preclude the use of test norms, but data were not presented which indicate how modifications affect test norms.

Many other writers, too, (e.g., Allen, 1959; Katz, 1956; Michael-Smith, 1955; Portenier, 1942; Strother, 1945) have been concerned with the problems encountered in evaluating handicapped children by traditional assessment devices, and they advocated the use of test modifications. As can be seen by Newland's (1963) above comments, the examiner must be very resourceful in devising methods for modifying standard procedures.

In a survey designed to determine the tests used for the intellectual evaluation of normal and handicapped children, Braen and Masling (1959) found that modifications of standardized intelligence tests (e.g., S-B and WISC) often occur in the assessment procedure; the specific modifications, however, were not reported by the respondents. The use of modifications thus implies that many individually administered intelligence tests cannot be administered in a standardized manner. Braen and Masling (1959) also pointed out that modifications do not permit the use of the standardized norms, because the modified test produces a different form of the test which does not have known reliability and validity.

The studies available in the area of departures from standard procedures are not conclusive. They have dealt with limited segments of WB subtests, have evaluated different orders of administration of S-B or Wechsler Adult Intelligence Scale (WAIS) items, or have studied procedural changes. Individual WB subtests were the focus in three of the five studies reporting significant results.

Guertin (1954) reported that college subjects performed better on the WB Arithmetic when the more difficult items were administered first than when the conventional order was followed. Evaluating three different placements of the WB Digit Span, Klugman (1948) reported that psychoneurotic subjects obtained the highest scores when the subtest appeared in the middle of the test, next highest scores when the subtest appeared at the beginning, and the lowest scores when the subtest appeared at the end. Hutton (1964) administered the S-B (L-M) and WISC Digit Span to 60 subjects, the majority of whom were retarded. Significantly higher scores were obtained on the S-B digit repetition items. Because the Full Scale WISC was not administered, the results cannot be accepted as indicating differences between the S-B and WISC per se.

Hutt (1947), by alternating hard and easy items (adaptive method) on the S-B (L), was able to produce a significant gain in IQ scores with poorly adjusted subjects ranging from kindergarten to ninth grade. The adaptive method, however, did not produce a significant difference for a well-adjusted group. Paralleling Hutt's (1947) findings are those of Greenwood and Taylor (1965). An adaptive method with the WAIS was used: Each subtest was begun with an item below the subject's anticipated mental level and easy and hard items were alternated by using scale items or a pool of similarly easy items. The adaptive method resulted in significantly increased retest scores for subjects between 65 and 75 years of age, but not for above-average college subjects.

Serial administration of the S-B (grouping items of the same content together) has been evaluated in two studies. Frandsen, McCullough, and Stone (1950) administered the S-B (forms L & M) under conventional and serial orders to subjects from 5 to 18 years of age, and no significant IQ differences were found. Spache (1942), while not experimentally manipulating any variables, computed two S-B (L) IQs, one standard and one based upon items that could be arranged serially. Significant differences were not found in test scores for a group of gifted subjects between two and nine years of age.

Procedural changes have not been found significant in five studies. Allowing elderly subjects (over 60) unlimited time on the WAIS made very little difference in their test scores (Doppelt & Wallace, 1955). Affleck and Frederickson (1966) found that scoring the WAIS Picture Arrangement on the basis of four consecutive failures failed to make a significant difference for a group of 671 subjects. The IQ was affected by the new scoring rule in only 2.8% of the cases, and only in three cases did the Full Scale IQ change by as much as two points. Schonell (1956) used three different methods to compute S-B IQs and found that, for a group of 354 cerebral palsied children, 74% obtained identical IQs. The first was the standard method of computing the IQ (tested IQ); the second, a modified IQ, credited the subject with passing items which the examiner judged the subject would have passed if not for the subject's disability; and the third, an estimated IQ, established an IQ based upon the examiner's estimate of the subject's overall ability. Schonell concluded that these computational modifications do not significantly affect the overall test results.

Mogel and Satz (1963) studied an abbreviated administration of the WAIS and concluded that disruption in the continuity of item difficulty has a negligible effect on test results; 60 neuropsychiatric patients served as subjects in a test-retest design. Norris, Hottel, and Brooks (1960) found that individual and group administration of the Peabody Picture Vocabulary Test to 60 fifth grade subjects of average intelligence resulted in similar mean scores. Practice increased the mean IQ by only one point.

Studies concerned with departures from standard procedures do not appear to strongly confirm the assumption that modifying standard procedures seriously affects the overall test results. Of the 12 studies reviewed, 5 reported significant results, while 7 reported nonsignificant results. Modifications in procedures, at times, affect only certain subject populations. Children and college age subjects are usually not affected (six of seven studies employing these groups reported no significant effects), while specialized groups composed of either elderly, disturbed, or retarded tend to be affected by the departures (four of seven studies employing these groups reported significant effects). In light of the limited number of studies, the rather minute procedural changes often studied, and the fact that some studies demonstrate a significant effect resulting from departures from standard procedures, the examiner should follow standard procedures. However, Littell's (1960) conclusion from his review of the WISC is apropos: "The possible effects of differences in the examiner's techniques of administration is another problem area which has not received the attention it merits . . . /p. 146/."

Situational Variables

A variety of attempts have been made to alter the testing conditions systematically. They have ranged from varying incentive and ego involvement to using money, praise, and other reinforcement procedures. This section reviews 20 studies; significant findings appeared in 5, nonsignificant in 12, and both significant and nonsignificant in 3.

Subjects between approximately 9 and 14 years of age were studied in four of the five studies with significant findings. Failure, frustration, or discouragement appeared as a variable in all five studies with significant findings. Lantz (1945) found that 9-year-old males, when examined with the S-B (L & M), had lower scores after a failure experience. Success experience, on the other hand, did not significantly increase their scores.

Discouragement significantly lowered the S-B (L & M) scores of eighth grade subjects (Gordon & Durea, 1948) and the S-B (L) scores of above-average fifth and sixth grade subjects (Pierstorff, 1951). Solkoff (1964) evaluated the effects of three degrees of frustration on WISC Coding performance of 36 brain-injured, 9-year-old male subjects. High frustration (interrupting a marble game task and withholding of a promised reward) significantly impaired performance compared to low frustration or control conditions. Schizophrenics exposed to a failure experience had lower scores than a control group of schizophrenics on a repeated administration of a test similar to the WB Similarities (Webb, 1955).

Discouragement, anxiety, or distraction was evaluated in eight of the studies with nonsignificant results, and college students were employed in seven of these. A positive administration, characterized by an approving and interested manner, and a negative administration, characterized by a rejecting and disinterested manner, did not significantly affect college subjects' performance on a short form of the WAIS (Murdy, 1962). College subjects' Digit Symbol performance was similar under success, failure, and neutral conditions (Mandler & Sarason, 1952). In Walker et al.'s (1965) study, three different failure conditions resulted in similar WAIS Object Assembly performances. Failure condition scores were also not significantly different from control condition scores.[2] Truax and Martin (1957) found that WB Arithmetic scores of college females were similar under mild and severe threat conditions; for the total group, however, performance was better for subjects tested after a 24-hour period than for those tested immediately after the threat was induced. Anxiety and/or distraction failed to affect Digit Span performance in three different studies employing college subjects or newly admitted psychiatric patients (Craddick & Grossman, 1962; Guertin, 1959; Walker & Spence, 1964). Three different incentive conditions--verbal praise, verbal reproof, and candy--employed by Tiber and Kennedy (1964) had no significant effect on second and third grade white and Negro subjects' S-B (L-M) scores.

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[2] R. E. Walker, personal communication, May 1966.

The remaining four studies with nonsignificant results used some form of ego involvement; three used college subjects. Achievement-oriented and neutral instructions resulted in similar scores on the four WAIS subtests (Comprehension, Vocabulary, Digit Symbol, Block Design) administered to 96 college subjects by Sarason and Minard (1962). Guertin (1954) found that when college subjects received instructions designed to minimize resignation attitudes their WB Arithmetic scores were similar to scores obtained under standard conditions. Nichols (1959) employed 11 examiners and evaluated subjects' performance under two conditions of ego involvement and two conditions of success. No significant effects on WB scores were found for any of the variables with superior college subjects. Klugman (1944) found that money and praise incentives had similar effects on S-B (L & M) scores of subjects between the ages of 7 and 14.

Both significant and nonsignificant findings have been reported in three studies. Gallaher (1964) administered the WB (II) Digit Symbol to female volunteer college subjects. A month later a difficult vocabulary test was administered to experimental groups concomitantly with either positive or negative examiner remarks, or with an extended series of difficult tests at which subjects failed. The WAIS Digit Symbol was then administered. While change scores were not affected by the examiner's remarks, the three experimental groups performed significantly better (higher change scores) than the control group on the second Digit Symbol. Griffiths (1958) reported that experimentally induced anxiety impaired WB Digit Span and Information scores. However, the college subjects' scores on Arithmetic, Object Assembly, and Digit Symbol were not adversely affected. Moldawsky and Moldawsky (1952) equated college subjects for verbal intelligence and then administered in a counterbalanced order the WB Digit Span and Vocabulary under anxiety and neutral conditions. One significant effect was found: Vocabulary-Digit Span order under the anxiety condition produced lower Digit Span scores, while Vocabulary scores were not affected.

It has often been suggested that anxiety disrupts immediate memory. Some of the studies reviewed in this and other sections specifically investigated memory ability in relation to the various experimental conditions. Seven studies reported significant findings--a decrement in memory functioning--as a result of such factors as adjustment, anxiety, discouragement, failure, location, method of presentation, and rapport (Exner, 1966; Gordon & Durea, 1948; Griffiths, 1958; Hutton, 1964; Klugman, 1948; Pierstorff, 1951; Young, 1959). Nonsignificant findings have been reported in six investigations which studied anxiety, distraction, failure, time, and the examiner's race (Craddick & Grossman, 1962; Doppelt & Wallace, 1955; Forrester & Klaus, 1964; Guertin, 1959; Lantz, 1945; Walker & Spence, 1964), and one reported both significant and nonsignificant results (Moldawsky & Moldawsky, 1952). Other studies have also incorporated digit span items, but the vulnerability of these items to the experimental conditions cannot be evaluated because specific items were not reported. The evidence, however, suggests that immediate memory, as measured by digit-span performance, is susceptible to procedural, situational, and interpersonal factors.

Generalizations concerning the effects of situational variables on test performance must be tentative. Discouragement is likely to affect the performance of children between 9 and 14 years of age, but not of college subjects. Praise has never been reported to produce significantly better performance than control or other experimental conditions. Little attention has been devoted to the effects of situational variables on emotionally disturbed groups. The results suggest that children are especially vulnerable to discouragement.

Examiner Variables

The examiner has often been cautioned to prevent his test administration from being influenced by his impression of the subject--the "halo" effect. Scoring, probing, and inquiring may be affected by the examiner's impression of whether the subject may be able to answer the questions. Burgemeister (1962) illustrates the "halo" effect in the examination of cerebral palsied subjects: "Motivated by a feeling of sympathy often reinforced by seeing the physical energy expended by so many palsied children in following instructions, the examiner easily believes his hope, i.e., that the child knows more than he can express, and hence overestimates the child's ability /p. 117/."

McFadden (1931) observed in an experiment employing the S-B that examiners may differ in giving help and in leniency in scoring: "This makes comparisons of different examiners liable to error when the subtests are considered /pp. 62, 64/." Goodenough (1940) also discussed the possibility of systematic errors in test administration and in test scoring. She noted that no experiment had been reported, at the time she wrote her article, which evaluated how the examiner's knowledge of the subject's scores obtained on previous examinations may affect the examiner's testing procedures. Even now, little information is available concerning the very important point raised by Goodenough. Ekren (1962) has, however, evaluated the effect of the examiner's knowledge of the subject's ability upon test scores. Eight undergraduate male examiners were led to believe that half of their subjects were earning high grades in school, and that the other half were earning lower grades. Because similar WAIS Block Design scores were obtained for the two groups, Ekren (1962) concluded that the knowledge variable had no significant effect.

Turning to studies evaluating the examiner-subject relationship, Sacks (1952) administered the S-B (L & M) to 3-year-old subjects. On a repeated test administration, a good relationship between the examiner and the subject produced a significantly greater gain than a poor relationship. However, while not significantly different from the control group, the poor relationship group also obtained higher scores on the repeated test administration. Exner (1966) studied the effect of examiner rigidity in 33 pairs of subjects from 7 to 14 years of age. Subjects in each pair were initially matched on age, sex, and S-B IQ. The WISC was administered to 25 pairs in the conventional order and to 8 pairs in a reversed order. Compared to rapport conditions, rigid conditions resulted in lower Verbal and Performance IQs under the conventional order of administration and a lower Performance IQ under the reversed order of administration. The effect of the rigid examiner condition was most noticeable on the subtests administered early in both conventional and reversed order administrations.

Hardis (1955) administered the WB (I and II) to 40 male adolescents under rapport and standard conditions in a test-retest design. Verbal, Performance, and Full Scale IQs, scatter patterns, and change scores did not differ between the two conditions.

Hata, Tsudzuki, Kuze, and Emi (1958) evaluated test-retest scores as a function of the examiner-subject relationship and the subject's personality. The subjects were assigned to either a preferred or nonpreferred examiner. A group IQ test was first administered by the classroom teacher. Nine examiners then administered an individual IQ test to 147 12-year-old subjects. Results indicated that subjects examined by a preferred examiner received improved scores on the individual test, as compared to subjects examined by a nonpreferred examiner. The subjects with a favorable or neutral attitude toward people also had improved scores with preferred examiner, while those subjects with a less favorable attitude toward people did not significantly improve with a preferred examiner.

Schizophrenic subjects have also been studied. An authoritarian and an understanding examiner administered the WAIS Similarities and Block Design and a number of other measures to process and reactive schizophrenics and nonschizophrenic Veterans Administration males (Gancherov, 1963). Process schizophrenics were the only group having significantly lower scores when tested by the understanding examiner. Schupper (1955) investigated the effects of an accepting and rejecting relationship on the performance of schizophrenic males. The subjects were placed in one of two groups depending upon the age at which they were first hospitalized. Both groups had lower WB Similarities scores under the rejecting condition. Understanding examiners lower the scores of process schizophrenics, while rejecting examiners lower the scores of schizophrenics not differentiated as to process or reactive types. It is likely, however, that some subjects in Schupper's (1955) study were of the process type. These apparently contradictory results are difficult to explain.

Young (1959) investigated personality patterns of both subjects and examiners. Using the Digit Span, he reported that "Subjects with 'poorly adjusted' experimenters performed better than subjects with 'well adjusted' experimenters, male subjects did better than female subjects, and digits forward were easier than digits backward /p. 375/." These examiners were college students from introductory psychology classes and should not be equated with examiners having graduate training or professional experience.

Familiarity with the examiner has been studied in two investigations. Marine (1929) reported that subjects between 3 years, 8 months and 8 years, 3 months who were familiar with the examiner did not perform in a significantly different manner on the 1916 S-B than those not familiar with the examiner. In contrast, mentally retarded subjects well acquainted or slightly acquainted with the examiner obtained higher scores on intelligence tests of the S-B and WB types than those subjects tested by a strange examiner (Tsudzuki et al., 1956).

The examiner's experience has been evaluated in five investigations, and four reported no significant differences between trained and less trained examiners. Jordan (1932) had 76 second- and third-year undergraduate examiners administer the 1916 S-B in a test-retest design, and a reliability coefficient of .84 was obtained. Jordan concluded, by comparing his results to published data, that inexperienced and experienced examiners obtain equally reliable IQs. Curr and Gourlay (1956) studied 8 trained and 10 untrained examiners who administered the S-B (L) to 8- and 9-year-old subjects in a test-retest design. The examiner's training was not found to be a significant variable. Plumb and Charles (1955), studying the WB, and Schwartz (1966), studying the WAIS, reported that both experienced and inexperienced examiners have essentially similar scoring disagreement patterns on Comprehension items. Masling (1959) did not find a significant relationship between the number of tests examiners had previously administered and (a) leniency in scoring and (b) number of reinforcing comments. In contrast to the nonsignificant findings reported above, LaCrosse (1964) found that test-retest scores were significantly different as a function of the number of tests the examiners had previously administered.

The examiner's race has been considered an important variable in testing for many years. Strong (1913), in a study employing the Binet-Simon Measuring Scale of Intelligence, noted that it was possible that the Negro subjects might have obtained different results with an examiner of their own race. Pressey and Teter (1919) questioned "whether tests given by white examiners to colored pupils can give reliable data for a comparison of the races /p. 278/." Garth (1922-23) felt that white subjects might have an advantage over Indian and Negro subjects when these groups are tested by a white examiner. Blackwood (1927) wrote that more research was needed to evaluate the effects of rapport and motivation in testing, especially when subjects and examiners are of different races. Klineberg (1935, 1944) suggested that poor rapport may exist between Negro subjects and white examiners. He indicated that testing Negro subjects in the South presents a special problem because the white examiner may "face an attitude of fear and suspicion which is certain to interfere with the performance of an intellectual task /1935, p. 156/."

The earliest reported investigation concerning the effect of examiner's race on intelligence test results was conducted by Canady (1936). He used the 1916 S-B and employed one Negro and 20 white examiners. Sattler (1966b), by reanalyzing Canady's data, showed that examiner's race interacts with the subject's race. On the first test administration subjects obtained higher IQs with examiners of their own race, while on the repeated examination subjects obtained higher IQs with examiners of the opposite race. LaCrosse (1964) found that a white examiner obtained significantly lower S-B (L-M) retest scores when testing Negro subjects who had been previously examined by a Negro examiner. The same white examiner, on the other hand, obtained significantly higher retest scores with white subjects previously tested by white examiners. Forrester and Klaus (1964) reported that on the S-B (L-M) 24 Negro kindergarten subjects achieved higher IQs when examined by a female Negro examiner than when they were examined by a female white examiner. However, the interaction between subject's race and test administration was not significant.

Studies have evaluated the effects of white examiners on the performance of either Negro subjects or of both Negro and white subjects. Pasamanick and Knobloch (1955) concluded that racial awareness is an important variable. In their study, 40 two-year-old Negro subjects obtained lower verbal responsiveness scores than other verbal scores when tested by a white examiner on the Gesell Developmental Examination. Klugman (1944), in a study employing one white[3] examiner, found that Negro subjects performed significantly better in a money incentive condition than in a praise incentive condition. White subjects, on the other hand, performed similarly in the two incentive conditions. In contrast to Klugman (1944), Tiber and Kennedy (1964) found that Negro and white subjects react similarly to various incentives administered by a white[4] examiner. In the Schachter and Apgar (1958) study discussed below, Negro and white subjects evaluated by white examiners had similar test-retest change scores.[5]

The examiner variable has been evaluated without specifying any particular parameters. Cattell (1937) noted that marked differences existed in the 1916 S-B scores obtained by examiners in the Harvard Growth Study. Cohen (1950, 1965) reported that out of 13 examiners one examiner obtained higher scores on the WB Arithmetic. Significant differences among 13 examiners administering the S-B (L-M) (Cieutat, 1965), among six examiners administering the S-B and the Illinois Test of Psycholinguistic Abilities (Smith & May, 1967a; Smith & May, 1967b), and among eight examiners administering the S-B (Smith, May, & Lebovitz, 1966) have been reported. Nichols (1959) reported no examiner differences among 11 examiners administering the WB, and Murdy (1962) reported no examiner differences among 8 examiners administering the WAIS. In a test-retest design, Schachter and Apgar (1958) investigated the changes between S-B (L) scores and WISC scores. At four years of age 119 subjects were administered the S-B, and approximately four years later the WISC was administered. By correlating the three scale WISC IQs with S-B IQs, they concluded that the obtained differences do not reflect examiner bias. Curr and Gourlay (1956) found that while small systematic errors existed among their examiners, the significant results were contributed by only one of the nine pairs of examiners studied. Plumb and Charles (1955), Schwartz (1966), and Walker, Hunt, and Schwartz (1965) found that experienced examiners generally fail to agree on scoring ambiguous Comprehension items appearing on the Wechsler tests.

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[3] S. F. Klugman, personal communication, December 1966.

[4] Race of examiner inferred.

[5] F. F. Schachter, personal communication, November 1966.

The major difficulty in evaluating the research findings with respect to examiner variables is that experimental procedures were frequently less than adequate. In the area of race differences, for example, Canady (1936) did not employ an equal number of Negro and white examiners--one Negro and 20 white examiners participated. White subjects in one condition achieved scores in the superior range, and thus a nonrepresentative sample may have existed (Sattler, 1966b).[6] Pasamanick and Knobloch (1955) failed to employ a Negro examiner and, yet, concluded that racial awareness was a significant variable; a Negro examiner might have obtained the same results. Similarly, in LaCrosse's (1964) study, the effect of the examiner's race on performance cannot be evaluated because a Negro examiner was not employed on the retest.

Turning to studies in the general area of examiner effects, Cattell (1937) did not report statistical tests for significance and subjects were from a preselected population. In Cohen's (1950, 1965) study, there is no way of knowing whether any bias existed in the referral procedures of assigning subjects to examiners, as he selected records from a mental hygiene clinic file. In the Smith and May (1967a, 1967b) and Smith, May, and Lebovitz (1966) studies examiners were of both races while the subjects were of only one race--either Negro or Caucasian. Thus, there were no controls for the interaction between examiner and race. Cieutat's (1965) study reveals design, sampling, and statistical problems.[7] Sattler (1966a) noted that Cieutat did not evaluate the possible effects of either

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[6] See Appendix N for reprint of study.

[7] See Appendix M for reprint of study.

Caucasian examiners examining Negro subjects or of nonrepresentative sampling, as subjects achieved IQs in the below average range. Incorrect statistical procedures were also employed, and it is not known whether subjects were randomly assigned to examiners.

Studies in the area of examiner effects have generally failed to use a random sample of examiners. Sampling of examiners is, of course, difficult, but some attempt should be made to study at least two levels of an examiner variable in order to have a more adequate basis for evaluating examiner effects. Hammond (1954) also stressed the need for representative sampling in studies evaluating examiner effects. In addition, many studies failed to assign subjects randomly. In studying racial influences it is important to employ examiners of both races and, preferably, subjects of both races. It is inappropriate to conclude that examiner's race is a significant variable when only one examiner race is employed. "Repeated testing of the same individual, both white and Negro, by both white and Negro examiners," was suggested by Dreger and Miller (1960), "in order to determine the proportion of variance in intelligence scores attributable to interaction of examiner and subject /p. 372/." Levy (1956) noted that because of the methodological problems existing in the area of examiner differences, an analysis-of-variance design (e.g., paired replicates, treatment by levels, or random replication) should be employed in order to allow for results which can be more meaningfully interpreted.

In spite of the many problems encountered in evaluating examiner variables, what can be concluded? Of the nine studies concerned with rapport, seven reported some significant findings. The subjects ranged from three years to college age and from mentally retarded to schizophrenic. Thus the data support the conclusion that the examiner-subject relationship is important. Familiarity, understanding, warmth, preference, and adjustment all play a role in altering subject's test performance, but not always in the same direction. On the other hand, there is little evidence that trained examiners differ from less trained examiners with respect to obtaining reliable results, being influenced by the subject, or scoring errors. Some confidence can be had in the results obtained by less qualified examiners.

More difficulty is encountered with respect to the race variable and to studies focusing on other examiner factors. Some subtle factor affecting the performance of Negro subjects with white examiners is suggested by five studies, while two did not report differences between Negro and white subjects tested by white examiners. Similarly, significant differences among examiners were found in eight studies, while three reported no significant differences. The examiner's race occasionally plays a significant role and examiners differ at times from one another on their obtained scores.

Subject Variables

Numerous studies overlap the classifications used in this paper, especially those concerned with the subject's race, and classifying a study in one area rather than another has been difficult and, at times, somewhat arbitrary. Studies discussed in other sections will not be cited again, with the exception of those in which subject variables were not previously discussed.

The subject's attitude toward the test situation may play an important role in determining the scores he receives. Williams (1940), for example, suggested that delinquents tested during a court appearance do not usually have a proper attitude toward the examination: "Inadequate rapport would systematically lower the scores of delinquents /p. 291/." Wittman (1937) noted that the lower scores obtained by schizophrenic patients on psychometric examinations may be due to psychological factors such as apathy, disinterest, and inattention rather than to intellectual deterioration caused by organic pathology. Rosenthal (1966) reanalyzed Ekren's (1962) data and reported that those subjects who perceived the examiner as being more casual and more talkative obtained higher WAIS Block Design scores.

Subject variables have been specifically studied in two investigations. Masling (1959) used accomplices as subjects to play "warm" and "cold" roles; examiners administered Information, Comprehension, and Similarities of the WB (II). While the behavior of examiners was differentially affected by the role pattern of subjects (e.g., with warm subjects, examiners used more reinforcing comments, gave more opportunity to clarify comments, and were more lenient in scoring), the differences, although statistically significant, were small. Wiener (1957) measured college subjects' distrustful attitudes and also employed instructions designed to create distrustful attitudes; WAIS Similarities, Picture Completion, and Vocabulary were administered. Scores were not significantly related to instructions, and instructions did not significantly interact with subjects' attitudes in altering test scores. Subjects with distrustful attitudes, however, had lower scores than subjects with nondistrustful attitudes on a measure contrasting the Picture Completion minus Vocabulary score with Similarities minus Vocabulary score.

Six studies covered in previous sections also examined the effect of a personality variable--anxiety--on test performance, and five report some significant findings related to anxiety. Of the four subtests administered in the Sarason and Minard (1962) study, two revealed an interaction effect between personality and experimental instructions: Low-test anxiety subjects had significantly higher Comprehension scores than high test anxiety subjects under achievement-oriented instructions but not under neutral instructions. High test-anxiety females had higher Digit Symbol scores under the neutral instructions, whereas high test-anxiety males performed in the opposite manner by achieving higher Digit Symbol scores under the achievement-oriented instructions than under the neutral instructions. On a Digit Symbol test administered by Mandler and Sarason (1952), low-test anxiety subjects performed better than high-test anxiety subjects, but only on one of six trials.

Test anxiety and manifest anxiety were not related to the experimental conditions employed by Walker and Spence (1964). However, control subjects' anxiety scores were significantly related to Digit Span scores: A significant negative correlation of

-.23 occurred between manifest anxiety and Digit Span scores, while a significant positive correlation of .26 resulted between test anxiety and Digit Span scores. The subjects in the experimental group, indicating on a postexperimental questionnaire that they were disturbed by the experiment, performed in an inferior manner to those not disturbed. In Gallaher's (1964) study, while manifest anxiety was not related to Digit Symbol performance under failure and incentive conditions, one group performed in a significantly different manner: High anxious subjects achieved higher scores after the failure experience than high anxious controls.

In studying Object Assembly performance, Walker, Neilsen, and Nicolay (1965) found a significant negative relationship between manifest anxiety and performance in only one of the four conditions studied, namely, when Object Assembly was preceded by an impossible task and was followed by simple instructions to perform the Object Assembly task. The one nonsignificant finding occurred in the Truax and Martin (1957) study: WB Arithmetic performance was not related to high and low manifest anxiety, nor was there an interaction effect between situational threat and anxiety. The evidence from the above studies suggests that anxiety, as a personality variable, at times interacts in a complex manner with test performance.

Discussion and Conclusions

Conclusions emerging from the review are as follows: Minor changes in test procedures are more likely to affect specialized groups than normal groups. Children are more susceptible than college age subjects to situational factors, especially discouragement. Rapport frequently affects test scores. Differences among examiners in obtaining test scores are occasionally noted, but little is known about the factors accounting for the differences. The examiner's level of experience is usually not a crucial variable. White examiners may have some subtle deleterious effect on Negro subjects' scores, but the evidence is only suggestive. Ego involvement usually does not result in better performance. The subject's anxiety level, as measured by personality scales, frequently is related to test performance in interaction with other variables. Immediate memory is affected by procedural, situational, and interpersonal factors.

The frequency of conflicting findings may be due to a number of factors. Investigators employed different test materials, and these materials may differ in their susceptibility to the experimental procedures. Truax and Martin (1957), for example, suggest that arithmetic functions involve relatively well learned past habits which are "not particularly susceptible to the effects of failure and general anxiety level /p. 19/." Vocabulary, too, would appear to be an area more resistant to the experimental variables, and yet the data are not conclusive. Murdy (1962) and Curr and Gourlay (1956) found, for example, that vocabulary was affected by the variables investigated, while other studies found vocabulary not susceptible to the experimental procedures (e.g., Exner, 1966; Moldawsky & Moldawsky, 1952). Klugman (1944), in order to account for the similar performance of subjects under praise and money incentives, referred to Terman's (1916) statement that S-B tasks are, to a high degree, novel and interesting. Thus the challenge of the material may override, in part, the effects of the experimental variables.

Considering the findings of Plumb and Charles (1955) and Schwartz (1966), which indicated that test items differ in eliciting ambiguous responses, it is conceivable that some situational and/or examiner or subject effects only occur on test items or on test responses which are more ambiguous or less highly structured. Another detail which differed among the studies concerned the administration of the experimental treatments. Some treatments were administered before the subjects responded, some throughout the test, and some after the subjects responded. In some studies it was difficult to ascertain which responses were being reinforced. Subjects also were possibly confused, for example, when the examiner made positive statements after a wrong response was given. The timing of the reinforcement (e.g., immediate or delayed) is also important, as Salzinger (1959) has shown, and this, too, differed in many studies. The conflicting results thus, in part, may be due to the different times at which the treatments were administered, the different methods of creating similar effects, and the possible ambiguity created by the variable times at which the treatments were administered.

No sanction to deviate from standard procedures is provided by the present review. However, the intelligence testing field needs to have available further data concerning how procedural departures and how situational, examiner, and subject variables may lead to significant alterations in test scores. For example, will help given to subjects during the administration of a test alter their performance? When does the examiner's race affect the subject's performance? Little is known about the effects of Negro examiners testing white subjects. What is the relationship between examiners' and subjects' personalities? Do any of these variables or a host of similar ones interact with developmental age, IQ level, examiner or subject sex, or degree of psychopathology? The available studies have not provided reliable answers to most of these questions.

While the data indicate that the examiner variables are important, many studies reported nonsignificant results. In addition, numerous methodological problems are encountered. Himelstein (1966) noted that "research with the S-B does not shed much light on the relative importance of extratest influences /p. 161/." In contrast, Kintz, Delprato, Nettee, Persons, and Shappe (1965) concluded from their review of the examiner effects: "All persons using test scores must recognize the strong influence of _E_ and make decisions accordingly /p. 230/." Kintz et al. (1965), with two exceptions, did not survey the literature discussed in the present review and based their conclusion on verbal conditioning studies and views presented by other writers. It appears that their conclusion is unnecessarily pessimistic.

Barbe (1965) concluded (_a_) that the examiner's reaction to the subject is perhaps more important than subject's reaction to the examiner in affecting intelligence test results; (_b_) that the examiner-subject relationship may be more potent in affecting younger subjects; and (_c_) that subjects with higher

IQs may be more susceptible to examiner's influence. The data of the review suggest that Barbe's second conclusion is merited, while further evidence is needed to evaluate his first and third conclusions.

While the objective administration and scoring of an examination remains an essential goal for all examiners, the authors feel that the complete elimination of the examiner from the examination would hamper the diagnostic process. Again, Kintz et al. (1965) differ from the authors with respect to the importance of the examiner's role: "The administrator contamination problem may eventually be resolved by the application of machines to the administration of tests /p. 230/." The present authors feel that the examiner's role is not one of simply being a reader of test items; he performs numerous functions such as establishing a relationship which enables the subject to perform at an effective level and evaluating the subject's motivational level. The discrepancy between results obtained from group and individually administered tests may be partially a function of the subject's motivation and/or his ability to follow directions. The value of the individually administered test situation lies in the examiner's ability to observe, report, and, if possible, modify the subject's attitude. At present, no machine is available that can assess motivational level and yield such statements as: "The subject did not try his best," or "Motivation was minimal." Using machines to administer tests will not solve the problem of evaluating the subject's motivation. Such evaluation is especially important because individual intelligence tests are administered, in the majority of cases, to subjects having motivational or adjustment problems.

A machine is able to present test questions in a standard manner, but what cues will the machine use to alter the test procedures (e.g., when an item will be repeated and how often)? Under what circumstances will the machine be programmed to all the subject to take a test break? Will all subjects receive the same reinforcement schedule and the same type of reinforcement? Quereshi (1960), from his investigation of mental test performance, concluded: "The commonly held belief that, for all practical purposes, test directions provide an adequate control of the S's motivation and/or mental set is clearly untenable /p. 76/." Test directions, it would appear, must at times be supplemented with other material in order to motivate the subject to work at his optimal level and in order to avoid ambiguity. Having a machine to present test questions, while eliminating some problems, may create many more problems for those desiring to assess intellectual ability. A possible alternative solution resides in a combination of man and machine test administration.

Objectives and Hypotheses

The administration, scoring, and interpretation of psychological tests are affected by many variables such as test content, procedures for administration and scoring, competence of the examiner, and the interpersonal relationship between the examiner and the subject. The reliability and validity of the test results are in part dependent upon the above variables. The objectives of the present investigation are to study the effect of some of the above variables on test performance. The primary objective is to determine how systematic alterations in test procedures affect the child's performance on two Wechsler subtests, PA and BD. Additional objectives are to evaluate the relationship between the WISC and Wechsler Bellevue Scale Form I (WB) for the PA and BD subtests, to present validity data for the two subtests, to examine differences between examiners, and to study the relationship between the various cues and test performance.

The objectives can be described in more concrete form as follows: (a) to evaluate the effectiveness of different BD help steps; (b) to determine the relationship between help steps and their effects on original and subsequent test performance; (c) to investigate the relationship between the WISC and WB for the two subtests administered under control (standard) and experimental (modified) procedures; (d) to determine the validity of the subtest scores obtained under control and experimental procedures by examining their relationship to grades by subject area; (e) to examine the relationship between cues (number of help steps, number of items on which help steps were administered, and pattern of cues) and test performance; and (*f*) to determine whether examiners differ in the scores they obtain from their subjects.

The following hypotheses are advanced: (*a*) Violation of standard procedures by administering help steps during the first administration of the subtests has no effect on test performance during the first administration. (*b*) Violation of standard procedures by administering help steps during the first administration of the subtests has no effect on test performance during a subsequent administration of a comparable form of the subtests. (*c*) There is no relationship between cues (help steps administered, help items, and pattern of help steps and help items) and test performance. (*d*) The scores obtained by different examiners do not differ significantly. Two experiments are reported which evaluated the hypotheses.[6]

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[6] The article referred to in Footnote 1, page 2, has recently been published. It is reprinted from the *Psychological Bulletin*, 1967, *68*, 347-360, by Sattler, Jerome M. and Theye, Fred, by permission of the American Psychological Association, copyrighted November 1967. Permission to reproduce this copyrighted material has been granted by the American Psychological Association (copyright owner) to the Educational Research Information Center (ERIC) and to the organization operating under contract with the Office of Education to reproduce ERIC documents by by means of microfiche or facsimile hard copy, but this right is not conferred to any user of ERIC materials. Reproduction by users of any copyrighted material contained in documents disseminated through the ERIC system requires permission of the copyright owner.

2. Experiment 1--Method

The first experiment was designed to determine the effectiveness of four different BD help steps upon original and subsequent test performance. A control group was also included which received no help steps. The data comparing the experimental and control groups' performance are useful for determining the effects of violating standard procedures, violations produced by administering one help step per design.

Subjects

The subjects were eighth and ninth grade students attending Mar Vista Jr. High School in Imperial Beach, California. The experiment was designed to evaluate the performance of intellectually and emotionally average students. Ability level was determined by scores obtained on the SCAT. The SCAT had been administered to all students one year prior to the study as part of the school district's evaluation and placement program. The average ability group was defined as those subjects obtaining a SCAT total score which was within .60 of a standard deviation on each side of the mean. This group includes approximately the middle 44% of the population, and approximates the number of subjects falling into what is usually considered the average IQ range, 90 to 109. In the Wechsler tests, an IQ range of 90 to 100 encompasses an area 24% below the mean, while the IQ range of 100 to 109 encompasses an area 22% above the mean.

The means and standard deviations of the SCAT total scores were obtained separately for eighth and ninth graders. For the eighth graders the mean was 269, with a standard deviation of 9.70; for the ninth graders the mean was 273, with a standard deviation of 10.30.

In order to obtain a sample which had minimal adjustment and learning difficulties, students were eliminated from the sample when they fell into any of the following categories: (a) culturally handicapped which includes students scoring in the upper half of the bottom quartile on the reading test of the Sequential Tests of Educational Progress (STEP); (b) educationally handicapped which is determined on the basis of STEP reading scores, individual psychological tests, and teacher ratings (generally refers to emotional disorders); (c) learning disability which is determined on the basis of STEP reading scores, and concentrates on those students for whom, it is felt, special classes would be most beneficial. Students falling into two other groups were also eliminated from the samples: (a) non-native born, and (b) those who had been previously administered the WISC or WB. The school provided lists of students who fell into any of the above five categories; Table 1 shows these students in the category "eliminated: special programs."

Table 1 presents a breakdown of how the subjects were obtained for Experiment 1. Initially 320 subjects had SCAT total scores within .60 of a standard deviation on each side of the mean. It was necessary to eliminate 150 subjects from the initial sample for the various reasons shown in Table 1. The subjects eliminated because of improper administration included 33 subjects who were tested incorrectly as a result of one examiner's misunderstanding of the instructions. The remaining 20 subjects in this category were eliminated due to various errors in administration made by all of the examiners.

There were 54 subjects who did not need any help; they were able to arrange every block design correctly on the first administration. These subjects were eliminated from both the experimental and control conditions. Their perfect performance did not permit the testing of the hypotheses.

Table 1

Sample for Experiment 1

Selection of sample	Male		Female		
	Grade				
	8th	9th	8th	9th	Total
Originally selected	93	77	81	69	320
Eliminated: special programs	15	16	6	6	43
Eliminated: improper administration	31	2	16	4	53
Eliminated: did not need help	12	23	5	14	54
Sample for statistical analyses	35	36	54	45	170

Examiners

Three graduate students, two male and one female, attending San Diego State College, served as the examiners. The three examiners were majoring in psychology, had completed graduate work in intelligence testing, and were working toward their master's degree. When the experiment was initiated only one examiner served in the study, but it soon became evident that additional examiners would be needed. After the first examiner had tested approximately one-quarter of the subjects, the other two examiners were employed. Since the first examiner participated during the entire study, he tested several more subjects than the other two examiners.

The examiners obtained the names of their subjects by taking approximately six record forms for each day's testing from the top of a pile containing all of the record forms. While this procedure was not predesigned to ensure random assignment of the subjects to the examiners, the record forms were arranged in a randomized order. Each examiner tested both experimental and control subjects.

Procedure

Five groups (conditions) were employed to evaluate the effects of different BD help steps; four groups received different patterns of help steps, and the fifth was the control group. The four help steps administered to the respective groups were (*a*) presenting the first row, (*b*) presenting the last row, (*c*) presenting the first column, and (*d*) presenting the last column. The arrangement of the blocks for each of the help-step conditions is shown in Figure 1.

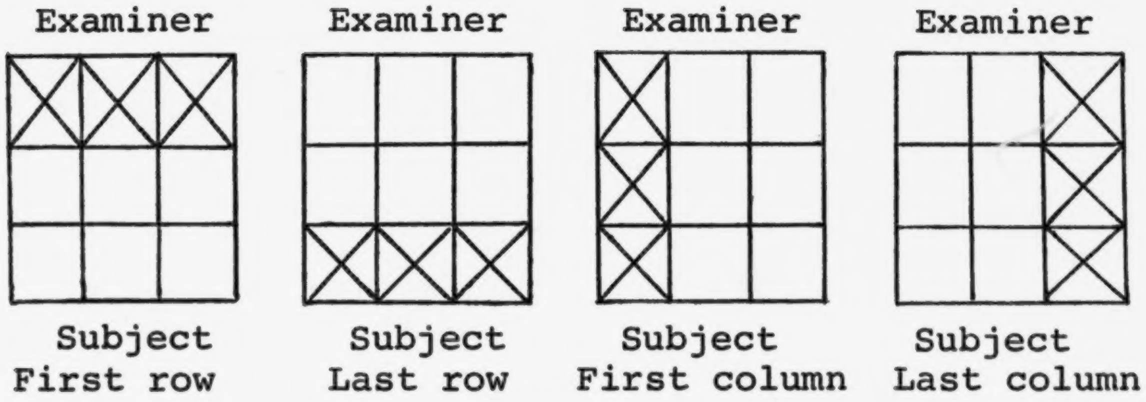

Fig. 1. Arrangements of blocks for each help-step condition for nine block designs. The X in the diagram indicates the blocks arranged for the subject. For the four block and sixteen block designs the corresponding rows or columns were used.

The subjects were assigned separately by sex to one of the five conditions. Because the WB does not take age into consideration when raw scores are converted to standard scores, the sample was divided into three-month-age intervals. Using a table of random permutations of nine, each subject within a three-month-age interval group was randomly assigned to one of the five conditions. The order of presentation of WISC and WB was counterbalanced by assigning odd numbered subjects to the WB-WISC order, and even numbered subjects to the WISC-WB order.

Each subject received two administrations. During the first administration the subjects in the experimental groups received the help steps, while the subjects in the control group were administered the BD subtest in the standard manner. During the second administration the alternate form of the subtest was administered, and no help steps were administered to any of the groups.

Wechsler's (1944, 1949) discontinuance criteria were used during both the first and second administrations: three consecutive failures on the WB BD, and two consecutive failures on the WISC BD. An item was considered failed when the subject could not complete the item correctly when it was first administered; passing the item after the help step was administered was still considered a failure for discontinuance purposes.

The subjects were tested individually in rooms provided by the school. The examiner introduced himself to the subject by saying: "Hello, I am Mr. (Miss).... I am going to give you a short test in order to compare your present results with previous test scores. Your score today, however, will not be recorded on your school records and will not affect your grades in any way. We would like you to do the best you can. Do you have any questions?" The introduction was designed to help diminish the child's anxieties. After the testing was completed the examiner said: "Thank you for cooperating. I'd like to remind you that your score does not affect your grades, and it isn't reported on your school records. We are interested only in finding out more information about our tests. We are testing many students at the school, and you were selected by a method something like having your name pulled out of a hat."[1]

The following instructions were read to a subject when a help step was administered: "I'm going to put together some of the blocks. I will make the bottom row (or top row, left column, right column, depending upon the condition to which the subject was assigned). Now you go ahead and finish it. Look at the picture and make one just like it. Tell me when you are finished."

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[1] The principal of the school requested, in order to avoid unpleasant reactions from parents, that the students not be informed that they were participating in a research project. Despite the examiner's efforts to avoid generating anxiety, some students complained to their parents about their participation in the project. When the parents called the school they were usually told that the test was part of a research project, and that it was harmless to their children. This explanation was accepted by the parents, but it is not known whether other students at the school subsequently learned that the test was part of a research project. Few calls were received by the school after the first few weeks of the project.

Appendixes A and B contain copies of the recording forms used in the experiment. Two forms were used, one form for the WISC-WB order, and one for the WB-WISC order. The recording forms were based upon the WISC and WB recording forms and were modified to provide space for recording the performance under the help-step conditions. Copies of the forms used for recording incorrect designs appear in Appendixes C and D. Separate forms were used for the WISC and WB. Incorrect design arrangements were recorded during the first and second administrations for those designs failed before help steps were administered.

Grades

Two sets of grades, by academic subject area, were obtained for each subject: (a) one set from June of 1966, and (b) one set from January of 1967. Mathematics, Social Studies, and English grades were available for all subjects for both time periods. The Social Studies grade for eighth graders consisted of Geography for June 1966 when the subjects were in the seventh grade, and U. S. History for January 1967 when they were in the eighth grade. The Social Studies grade for ninth graders consisted of U. S. History for June 1966 when the subjects were in the eighth grade, and History of Western Civilization for January 1967 when they were in the ninth grade. Grades were also recorded for elective subject areas: Science, Spanish, Arts and Crafts, Homemaking, Shop, and Typing.

The grade point average (GPA) was determined by using all the grades obtained by the student during the semester. The subjects were tested during a two month period from the last week in January 1967 through the last week in March 1967. Thus the June 1966 grades represent those obtained at least six months prior to the experiment, while the January 1967 grades represent those obtained close to the time of the experiment.

3. Experiment 1--Results[1], [2]

The effectiveness of the four BD cues was evaluated by a three factor analysis of variance design with repeated measures on one factor. The two independent factors were examiner and condition, while the repeated factor was the administration (first and second). Table 2 presents the means of the BD scores for each examiner, condition, and administration. A summary of the analysis of variance appears in Table 3. The results indicate that the subjects achieved significantly higher scores on the second administration than on the first administration. The four different cues did not differ among themselves in affecting the subjects' performance on either the initial or second administration. The experimental groups, i.e., those receiving help, did not perform in a significantly different manner from the control group. The three examiners obtained similar BD scores from their subjects on both administrations.

The four hypotheses are supported by the results presented in Table 3. The results show that violating standard procedures by administering help during the first administration had no effect on scores obtained on either the first or second administration; that the various cues (help steps) had no significant differential effect on test performance; and that different examiners obtained similar scores.

A three factor analysis of variance was employed to evaluate whether the BD scores differed as a function of sex and condition (two independent factors) and administration (a repeated factor). The means for these factors appear in Table 4, and the results of the analysis of variance appear in Table 5. Only the administration factor was significant: the second administration resulted in higher scores than the first administration.

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[1] Appendix E, Table 44, contains the raw data for all the variables of Experiment 1.

[2] All of the analyses of variance in Experiment 1 employed the unweighted means analysis procedure because of unequal cell frequencies.

Table 2

Mean Block Design Scores for Examiners, Conditions, and Administrations

Adminis-tration	C	FR	LR	FC	LC	Total
			Examiner 1			
	(N = 20)	(N = 17)	(N = 15)	(N = 19)	(N = 17)	(N = 88)
First	9.00	8.47	8.73	9.63	9.53	9.07
Second	11.20	10.00	9.87	10.95	11.00	10.60
Total	10.10	9.24	9.30	10.29	10.26	9.83
			Examiner 2			
	C	FR	LR	FC	LC	Total
	(N = 6)	(N = 8)	(N = 9)	(N = 10)	(N = 6)	(N = 39)
First	9.17	9.38	10.00	10.10	9.67	9.66
Second	10.67	10.50	11.89	12.40	12.67	11.62
Total	9.92	9.94	10.94	11.25	11.17	10.64

(Table 2 continued next page)

Table 2--Continued

Examiner 3

Adminis-tration	C (N = 7)	FR (N = 9)	LR (N = 10)	FC (N = 9)	LC (N = 8)	Total (N = 43)
First	8.28	8.44	9.20	9.78	9.50	9.04
Second	10.14	9.11	11.40	10.33	10.00	10.20
Total	9.21	8.78	10.30	10.06	9.75	9.62

Examiners Combined

	C (N = 33)	FR (N = 34)	LR (N = 34)	FC (N = 38)	LC (N = 31)	Total (N = 170)
First	8.82	8.76	9.31	9.84	9.56	9.26
Second	10.67	9.87	11.05	11.23	11.22	10.81
Total	9.74	9.32	10.18	10.53	10.39	10.04

Table 3

Analysis of Variance of Block Design Scores for Examiners, Conditions, and Administrations

Source	*df*	*MS*	*F*
Between Subjects			
Examiners (A)	2	28.19	2.62
Conditions (B)	4	14.51	1.35
A X B	8	3.43	.32
Error (between)	155	10.75	1.00
Within Subjects			
Administrations (C)	1	174.66	55.05*
A X C	2	3.96	1.25
B X C	4	1.31	.41
A X B X C	8	2.60	.82
Error (within)	155	3.17	1.00

*p < .001.

Table 4

Mean Block Design Scores for Sex, Conditions, and Administrations

Adminis-tration	C		FR		LR	
	M	F	M	F	M	F
	(N = 15)	(N = 18)	(N = 14)	(N = 20)	(N = 14)	(N = 20)
First	9.33	8.32	9.28	8.42	9.50	9.00
Second	11.53	10.16	10.36	9.68	12.14	9.95
Total	10.43	9.24	9.82	9.05	10.82	9.48

	FC		LC		Total	
	M	F	M	F	M	F
	(N = 17)	(N = 21)	(N = 11)	(N = 20)	(N = 71)	(N = 99)
First	9.59	9.95	9.73	9.45	9.49	9.03
Second	11.00	11.33	10.91	11.15	11.19	10.46
Total	10.29	10.64	10.32	10.30	10.34	9.74

Table 5

Analysis of Variance of Block Design Scores for Conditions, Sex, and Administrations

Source	*df*	*MS*	*F*
Between Subjects			
Conditions (A)	4	11.00	1.04
Sex (B)	1	29.04	2.75
A X B	4	8.90	.84
Error (between)	160	10.56	1.00
Within Subjects			
Administrations (C)	1	199.90	63.55*
A X C	4	1.89	.60
B X C	1	1.54	.49
A X B X C	4	2.99	.95
Error (within)	160	3.14	1.00

$^{*}p < .001$.

The remaining results indicate that the sexes performed in a similar manner, and that the five conditions resulted in similar scores. The latter finding and the finding of a significant difference between administrations corroborate the findings reported in Table 3.

The experiment was designed so that the WB and WISC BD subtests were administered in a counterbalanced order. A two factor analysis of variance design was used to investigate whether the two BD forms differed as a function of the order in which they were administered. The nonrepeated factor was the condition by test form order of administration. This factor has ten levels consisting of the two test form orders within each of the five conditions. The repeated factor was the administration (first and second). The means for these factors appear in Table 6, and the results of the analysis of variance are shown in Table 7. The condition by test form order factor was not significant, while the administration factor was significant. These results indicate that there were no significant differences among the scores obtained as a function of the help conditions and order of administration of the WISC or WB. A Scheffé test was used to evaluate whether the WISC and WB total means differed. The result was not significant ($t = .70$, $df = 160$, $p > .05$). Thus the two BD test forms produced similar scores.

The examiner effect was also investigated (see Table 3 for an evaluation of the examiner variable with respect to BD scores) by evaluating the number of help items each examiner administered in the experimental groups for each test form order and for each experimental condition. A three factor analysis of variance was employed. Table 8 presents the mean number of help items for each examiner, and Table 9 presents the results of the analysis of variance. None of the factors were significant. Thus, the examiners, test form orders, and experimental conditions elicited a similar number of help items. The mean number of help items was 1.85.

The WISC and WB use different age intervals for obtaining the IQ. The WISC uses three month age intervals throughout the scale, as does the WB until year 14-6; from 14-6 to 15 the WB employs a six month interval, and then a 12 month interval for the ages 15 and 16. The construction of the norms is also different. The WISC employs standard scores separately for each age

Table 6

Mean Block Design Scores for Condition
by Test Form Orders and Administrations

Adminis-tration	C WISC First (N = 15)	C WB First (N = 17)	FR WISC First (N = 16)	FR WB First (N = 16)	LR WISC First (N = 19)	LR WB First (N = 15)
First	10.00	9.24	8.62	9.00	8.53	8.87
Second	11.20	10.94	10.62	11.12	9.37	10.53
Total	10.60	10.09	9.62	10.06	8.95	9.70

	FC WISC First (N = 15)	FC WB First (N = 19)	LC WISC First (N = 17)	LC WB First (N = 21)	Total WISC First (N = 82)	Total WB First (N = 88)
First	8.73	9.59	9.00	10.43	8.98	9.43
Second	11.13	10.63	11.00	11.33	10.66	10.91
Total	9.93	10.10	10.00	10.88	9.82	10.17

Table 7

Analysis of Variance for Block Design Scores for Condition by Test Form Orders and Administrations

Source	df	MS	F
Between Subjects			
Condition by test form orders (A)	9	9.34	.87
Error (between)	160	10.72	1.00
Within Subjects			
Administrations (B)	1	212.18	68.04*
A X B	9	2.58	.83
Error (within)	160	3.12	1.00

*p < .001.

Table 8

Mean Help Items for Conditions, Test Form Orders, and Examiners

	FR		LR		FC	
Examiner	WISC First	WB First	WISC First	WB First	WISC First	WB First
1	2.00 (N = 8)	2.11 (N = 9)	2.00 (N = 7)	2.12 (N = 8)	1.70 (N = 10)	1.67 (N = 9)
2	1.60 (N = 5)	2.50 (N = 2)	1.67 (N = 3)	2.33 (N = 3)	2.40 (N = 5)	1.67 (N = 6)
3	2.50 (N = 6)	2.00 (N = 3)	1.60 (N = 5)	1.60 (N = 5)	1.50 (N = 2)	1.57 (N = 7)
Total	2.03 (N = 19)	2.20 (N = 14)	1.76 (N = 15)	2.02 (N = 16)	1.87 (N = 17)	1.63 (N = 22)

	LC		Total
	WISC First	WB First	
1	1.50 (N = 10)	2.00 (N = 7)	1.89 (N = 68)
2	1.50 (N = 4)	1.20 (N = 5)	1.86 (N = 33)
3	2.00 (N = 2)	1.67 (N = 6)	1.80 (N = 36)
Total	1.67 (N = 16)	1.62 (N = 18)	1.85 (N = 137)

Table 9

Analysis of Variance of Help Items for Test Form Orders, Examiners, and Conditions

Source	*df*	*MS*	*F*
Between Subjects			
Test form orders (A)	1	.04	.06
Examiners (B)	2	.06	.10
Conditions (C)	3	1.13	1.74
A X B	2	.36	.56
A X C	3	.33	.51
B X C	6	.60	.93
A X B X C	6	.65	1.01
Error (between)	113	.65	1.00

interval, while the WB uses one set of standard scores throughout the entire age range. While the original subject population was randomly assigned to conditions by three month age intervals, a number of subjects were lost from the final sample because of the various reasons presented in Table 1. Therefore a two factor analysis of variance was employed to evaluate whether the ages of the subjects differed within each sex and within each condition by test form order of administration. Table 10 presents the mean ages, and Table 11 summarizes the results of the analysis of variance. The results indicate that the subjects' ages were similar in the ten condition by test form orders of administration. The male group, however, was significantly older than the female group by 1.29 months. The results indicate that the randomization procedures designed to have similar ages in each condition and test form order were effective.

The ability level of the subjects as measured by the SCAT in the five conditions was evaluated by two separate three way analyses of variance, each having the SCAT scales, Verbal (V) and Quantitative (Q), as the repeated measure. In the first analysis, examiner and condition were used as the independent measures. Table 12 presents the mean SCAT scores, and Table 13 shows the results of the analysis of variance. The condition factor was not significant; thus, the subjects in the five conditions did not differ in their ability level. The examiner and SCAT scale factors were significant. A Newman-Keuls test was used to determine the significant differences among the three examiner means. The results indicated that the subjects tested by examiner 1 had a significantly lower SCAT mean than those tested by examiners 2 and 3. The significant SCAT scale factor indicates that the subjects had a higher Q than V scale.

The second analysis of variance of SCAT scores used sex as a factor instead of examiner. The means are presented in Table 14, and the results of the analysis of variance appear in Table 15. Neither the condition factor nor the sex factor were significant. The significant SCAT scale factor again indicates that the SCAT Q scale was higher than the SCAT V scale.

The relationship among the variables employed in Experiment 1 was evaluated by product moment

Table 10

Mean Ages in Months for Condition by Test Form Orders and Sex

	C		FR		LR	
Sex	WISC First	WB First	WISC First	WB First	WISC First	WB First
Male	175.86 (N = 7)	171.00 (N = 8)	171.88 (N = 8)	177.17 (N = 6)	178.33 (N = 6)	177.00 (N = 8)
Female	167.22 (N = 9)	173.33 (N = 9)	173.64 (N = 11)	168.22 (N = 9)	171.56 (N = 9)	172.00 (N = 11)
Total	171.54 (N = 16)	172.17 (N = 17)	172.76 (N = 19)	172.69 (N = 15)	174.94 (N = 15)	174.50 (N = 19)

	FC		LC		Total	
	WISC First	WB First	WISC First	WB First	WISC First	WB First
Male	171.50 (N = 8)	172.33 (N = 9)	173.17 (N = 6)	166.00 (N = 5)	174.15 (N = 35)	172.70 (N = 36)
Female	167.78 (N = 9)	171.67 (N = 12)	173.30 (N = 10)	168.70 (N = 10)	170.70 (N = 48)	170.78 (N = 51)
Total	169.64 (N = 17)	172.00 (N = 21)	173.23 (N = 16)	167.35 (N = 15)	172.42 (N = 83)	171.74 (N = 87)

Table 11

Analysis of Variance of Age for Condition by Test Form Orders and Sex

Source	*df*	*MS*	*F*
Between Subjects			
Condition by test form orders (A)	9	80.66	1.30
Sex (B)	1	291.03	4.70*
A X B	9	82.47	1.33
Error (between)	150	61.89	1.00

*$p < .05$.

Table 12

Mean SCAT Scores for Examiners,
Conditions, and SCAT Scales

Examiner 1

SCAT Scale	C (N = 20)	FR (N = 17)	LR (N = 15)	FC (N = 19)	LC (N = 17)	Total (N = 88)
V	265.55	264.12	265.53	264.10	264.82	264.82
Q	271.10	275.94	267.00	270.32	269.82	270.84
Total	268.32	270.03	266.27	267.21	267.32	267.83

Examiner 2

	C (N = 6)	FR (N = 8)	LR (N = 9)	FC (N = 10)	LC (N = 6)	Total (N = 39)
V	269.83	271.00	271.67	267.90	271.33	270.35
Q	278.17	274.50	279.11	276.40	276.83	277.00
Total	274.00	272.75	275.39	272.15	274.08	273.67

(Table 12 continued next page)

Table 12--Continued

Examiner 3

SCAT Scale	C (N = 7)	FR (N = 9)	LR (N = 10)	FC (N = 9)	LC (N = 8)	Total (N = 43)
V	270.71	267.78	269.60	266.67	267.88	268.53
Q	275.00	274.22	271.90	272.67	277.12	274.18
Total	272.86	271.00	270.75	269.67	272.50	271.35

Examiners Combined

	C (N = 33)	FR (N = 34)	L$\overline{\text{R}}$ (N = 34)	FC (N = 38)	LC (N = 31)	Total (N = 170)
V	268.70	267.63	268.93	266.22	268.01	267.90
Q	274.76	274.89	272.67	273.13	274.59	274.01
Total	271.73	271.26	270.90	269.68	271.30	270.96

Table 13

Analysis of Variance of SCAT Scores for Examiners, Conditions, and SCAT Scales

Source	df	MS	F
Between Subjects			
Examiners (A)	2	839.49	17.14*
Conditions (B)	4	35.64	.73
A X B	8	34.31	.70
Error (between)	155	48.97	1.00
Within Subjects			
SCAT Scales (C)	1	2711.98	47.59*
A X C	2	6.79	.12
B X C	4	28.86	.51
A X B X C	8	46.32	.81
Error (within)	155	56.99	1.00

*$p < .001$.

Table 14

Mean SCAT Scores for Sex, Conditions, and SCAT Scales

SCAT	C		FR		LR	
Scale	M	F	M	F	M	F
	(N = 15)	(N = 18)	(N = 14)	(N = 20)	(N = 14)	(N = 20)
V	266.93	267.83	267.78	265.95	269.50	267.57
Q	274.87	271.83	278.00	273.15	272.71	271.43
Total	270.90	269.83	272.89	269.55	271.11	269.50

	FC		LC		Total	
	M	F	M	F	M	F
	(N = 17)	(N = 21)	(N = 11)	(N = 20)	(N = 71)	(N = 99)
V	266.24	265.15	265.82	267.45	267.25	266.79
Q	274.12	270.60	270.64	274.40	274.07	272.28
Total	270.18	267.88	268.23	270.92	270.66	269.54

Table 15

Analysis of Variance of SCAT Scores for Conditions, Sex, and SCAT Scales

Source	df	MS	F
Between Subjects			
Conditions (A)	4	44.90	.76
Sex (B)	1	101.24	1.72
A X B	4	87.76	1.49
Error (between)	160	58.95	1.00
Within Subjects			
SCAT Scales (C)	1	3086.06	54.03*
A X C	4	57.56	1.01
B X C	1	39.19	.69
A X B X C	4	25.31	.44
Error (within)	160	57.12	1.00

*$p < .001$.

correlations. Table 16[3, 4] presents the intercorrelations among the variables common to all subjects. These variables include the three BD scores (first, second, and total), SCAT scores, GPAs, core subject area grades (English, Mathematics, and Social Studies), and age. The core subject areas are areas required of all the students. Of the 170 subjects who participated in the study, 19 are not represented in Table 16 because their records were incomplete.

All correlations using the SCAT Q, V, and total scores were corrected for curtailed range using the formula presented in McNemar (1962, p. 144). The correction procedure was used because the subject population was restricted in their SCAT scores, i.e., they were initially selected only if their SCAT total score was within .60 of a standard deviation from the mean of their class. The entire eighth grade and ninth grade student body at Mar Vista Junior High School was used to obtain the standard deviation of the uncurtailed group. Because the standard deviations were very similar for the eighth and ninth grade classes, an average standard deviation, taking into account the number of subjects in each grade in the experiment, was obtained to represent the uncurtailed sample for each SCAT scale and for the SCAT total score. All the correlations appearing in Tables 16 and 17 which employ the SCAT scores are corrected for restricted range of talent. The SCAT means and standard deviations, however, in Tables 16 and 17 are those of the subjects participating in the study.

Table 16 indicates that the three BD scores are highly significantly intercorrelated, and that there are a number of significant correlations between BD scores

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[3] The following abbreviations, not previously indicated, are used in Tables 16 and 17: Admin. 1 = the first administration; Admin. 2 = the second administration; Total BD = the sum of the first and second administration scores; G.P.A. = grade point average; Math. = Mathematics; Soc. St. = Social Studies; A. & C. = Arts and Crafts; Hmkng. = Homemaking.

[4] Correlations appearing in the tables of Experiment 1 are with the decimal point removed.

Table 16

Intercorrelation Matrix for Variables Common to
All Subjects in Experiment 1 (N = 151)

		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	Mean	SD
BD Admin. 1	1.	-	55	86	16	19	37	01	-03	-06	-10	10	02	-07	-09	03	9.20	2.35
BD Admin. 2	2.		-	90	25	12	39	05	04	01	-13	12	14	-04	00	07	10.71	2.86
Total BD	3.			-	24	17	42	04	01	-03	-13	13	10	-06	-05	06	19.91	4.60
SCAT (V)	4.				-	08	86	08	25	08	19	14	13	09	25	30	266.68	7.73
SCAT (Q)	5.					-	85	25	31	03	-17	51	55	09	34	35	273.25	7.76
SCAT (T)	6.						-	27	47	11	08	57	59	15	51	57	270.93	4.51
G.P.A. 6/66	7.							-	55	80	42	72	40	78	44	-14	2.30	.70
G.P.A. 1/67	8.								-	40	71	38	64	44	74	05	2.11	.62
English 6/66	9.									-	43	45	31	64	34	-11	2.46	.85
English 1/67	10.										-	14	28	44	46	-12	2.13	.83
Math.6/66	11.											-	41	48	34	-01	2.07	.92
Math.1/67	12.												-	29	45	06	2.11	.86
Soc. St. 6/66	13.													-	37	-31	2.17	.93
Soc. St. 1/67	14.														-	03	1.87	.86
Age	15.															-	171.56	7.92

Note.--For a one-tailed test with N = 151, significance is indicated at the .05 level when r = .13 and at the .01 level when r = .18.

Table 17

Correlations of Other Subject Areas With Variables Common to All Groups in Experiment 1

	BD Admin. 1	BD Admin. 2	Total BD	SCAT (V)	SCAT (Q)	SCAT (T)	G.P.A. 6/66	G.P.A. 1/67	English 6/66	English 1/67	Math. 6/66
Science 6/66	-10	13	01	-06	01	-09	59	05	38	00	22
Science 1/67	02	07	05	13	48	54	39	67	24	28	37
Spanish 6/66	-06	-05	-06	-11	26	16	78	54	55	40	41
Spanish 1/67	-16	-08	-14	16	32	38	60	77	43	55	27
A. & C. 6/66	04	17	11	14	-11	-02	36	23	04	00	25
A. & C. 1/67	22	22	22	89	32	82	35	69	11	25	73
Hmkng. 6/66	35	38	39	19	49	74	82	28	54	18	77
Hmkng. 1/67	06	07	07	38	08	58	12	60	07	37	15
Shop 6/66	37	10	29	-32	44	09	46	24	35	20	10
Shop 1/67	34	15	28	41	24	51	33	68	18	48	37
Typing 1/67	-08	07	00	18	-30	-15	07	65	26	30	14
Help Items	-65	-50	-64	-22	-10	-32	01	10	11	08	-03

(Table 17 continued next page)

Table 17--Continued

	Math. 1/67	Soc. St. 6/66	Soc. St. 1/67	Age	Mean	SD	N	r required for significance	
								.05	.01
Science 6/66	-09	42	21	-11	1.94	.80	50	23	32
Science 1/67	45	36	52	26	1.71	.76	84	18	25
Spanish 6/66	43	48	32	-06	2.41	1.19	98	17	23
Spanish 1/67	34	46	48	19	2.25	1.11	95	17	24
A. & C. 6/66	22	-03	21	27	2.60	.92	35	28	38
A. & C. 1/67	48	34	36	-21	1.93	.89	15	41	56
Hmkng. 6/66	30	51	30	19	3.00	1.00	29	30	41
Hmkng. 1/67	37	06	19	-07	2.90	1.02	52	23	32
Shop 6/66	16	32	24	-18	2.44	.73	18	40	54
Shop 1/67	30	29	29	-03	2.48	.76	44	25	34
Typing 1/67	08	04	17	20	1.96	1.04	26	33	45
Help Items	02	03	10	-02	1.85	.80	120	15	21

and the other variables. The BD scores are significantly positively related to the three SCAT scores with the exception of the correlation between the BD scores obtained on the second administration and the SCAT Q scale. The SCAT total score has the highest correlations with BD performance. BD scores on the first administration do not significantly correlate with any grades or with the GPA. BD scores on the second administration, however, correlate significantly negatively with English 1/67 grades and positively with Mathematics 1/67 grades. The total BD score is significantly negatively related to English 1/67 grades and positively related to Mathematics 6/66 grades. The results indicate that the relationship between BD and grades obtained in the core courses is very low, and those correlations which reach significance are all below .15. Thus BD performance is not a good predictor of academic grades using the restricted sample of the present study.

The relationship between SCAT scales and core subject area grades is very strong. The SCAT V score correlates significantly with GPA 1/67, English 1/67, both Mathematics grades, Social Studies 1/67, and age. However, the SCAT V score does not correlate significantly with the SCAT Q score. The SCAT Q score is significantly related to both GPAs, English 6/66, both Mathematics grades, Social Studies 1/67, and age; however, it is significantly negatively related to English 1/67. The SCAT total score is significantly related to both Mathematics grades, to both Social Studies grades, to both GPAs, and to age.

The correlations among the core subject area grades, and between GPA and grades are very high; all are significant. The lowest significant correlations are found between English and Mathematics grades. The highly significant correlations between GPA and the grades obtained in the same semester as the GPA are somewhat of an artifact because the grades are part of the GPA.

Age is significantly negatively related to Social Studies 6/66 and GPA 6/66, and significantly positively related to the three SCAT scores. Age is not significantly related to any other variables shown in Table 16.

Table 17 presents the correlations between subject areas other than those presented in Table 16, usually elective areas, and variables common to all subjects. The correlations between help items and variables common to all subjects also appear in Table 17. Only the experimental group is represented in the correlations involving help items. Elective subject areas were included only if there were grades available for a minimum of ten subjects.

The three BD scores are significantly related to Homemaking 6/66 grades, while, in addition, the first administration BD and total BD scores are significantly related to Shop 1/67. There is, as expected, a strong significant negative relationship between the number of help items administered and BD scores.

SCAT scales, as shown in Table 17, are significantly positively related to a number of elective subject area grades. The SCAT V score correlates significantly with Arts and Crafts 1/67, Homemaking 1/67, and Shop 1/67; the SCAT Q scale with Science 1/67, both Spanish grades, Homemaking 6/66, and Shop 6/66; the SCAT total scale with Science 1/67, Spanish 1/67, Arts and Crafts 1/67, both Homemaking grades, and Shop 1/67. The SCAT V and SCAT total scale scores are also significantly negatively related to help items, while the SCAT Q scale is not significantly related to help items.

The two GPAs significantly correlate with all of the elective subject area grades with the exception of the following: GPA 6/66 is not significantly correlated with Arts and Crafts 1/67, Homemaking 1/67, and Typing 1/67, while GPA 1/67 is not significantly correlated with Science 6/66, Arts and Crafts 6/66, Homemaking 6/66, and Shop 6/66. When the nonsignificant correlations occur, they are between the GPA of one semester and the elective subject area grades of the other semester.

There are many significant as well as nonsignificant correlations among the elective subject area grades and core subject area grades. Science 6/66 significantly correlates with English 6/66 and Social Studies 6/66 grades. Science 1/67 significantly correlates with both English, both Mathematics, and both Social Studies grades. Spanish grades significantly correlate with both English, both Mathematics, and both Social Studies grades. Arts and Crafts 6/66 does not significantly correlate with any of the core subject area grades, while Arts and Crafts 1/67 significantly correlates with both Mathematics grades. Homemaking 6/66 significantly correlates with English 6/66, the two Mathematics grades, and the two Social Studies grades. Homemaking 1/67 significantly correlates with English 1/67 and Mathematics 1/67. Shop 6/66 does not significantly correlate with any of the three core subject area grades, while Shop 1/67 significantly correlates with English 1/67, the two Mathematics grades, and the two Social Studies grades. Typing does not significantly correlate with any of the three core subject area grades.

Help items are not significantly related to GPA or to the three core subject area grades or to age. Age significantly correlates with Science 1/67 and with Spanish 1/67 grades.

4. Experiment 2--Method

Experiment 2 was designed to measure the effects of a series of help steps rather than only one help step, and to evaluate two subtests, BD and PA. Because the first column cue was found to be the most effective in Experiment 1 (although not significant), it was used as a basis for establishing the BD help steps in Experiment 2.

Subjects

The subjects in Experiment 2 were similar, with some slight exceptions, to those employed in Experiment 1. Students from two junior high schools were used. The subjects attending Mar Vista Junior High School were in the seventh grade, while in Experiment 1 they were in the eighth and ninth grades. The subjects from National City Junior High School were in seventh and eighth grades. As in Experiment 1, the SCAT was used as the measure of intellectual ability, and similar procedures for selecting average ability students were used, namely, those falling within .60 of a standard deviation on either side of the mean. None of the subjects participating in Experiment 1 participated in Experiment 2.

The means and standard deviations of the SCAT scores were obtained separately for seventh and eighth graders at each school. For the seventh graders at National City the mean was 268, with a standard deviation of 10.20; for the eighth graders at National City the mean was 264, with a standard deviation of 10.30; and for seventh graders at Mar Vista the mean was 268, with a standard deviation of 9.50.

The five categories used to eliminate students from the Mar Vista sample in Experiment 1 were again used. However, the National City school used slightly different categories than the ones employed at Mar Vista. These were (*a*) educationally handicapped, and (*b*) students in special classes for those with English as a second language. Non-native born and those who had previously been administered the WISC or WB were also eliminated from the National City sample.

The schools provided lists of students falling into the above categories; Table 18 shows these students in the category "eliminated: special programs."

Table 18 presents a breakdown of how the subjects were obtained for Experiment 2. Initially 252 subjects had SCAT scores within .60 of a standard deviation on each side of the mean. It was necessary to eliminate 106 subjects from the initial sample for the various reasons shown in Table 18 Five subjects were eliminated because of improper administration. There were 49 subjects who did not need help on either the BD or PA subtests; that is, they were able to solve every problem correctly on the first administration of either subtest. These subjects were eliminated from both the experimental and control conditions. Their perfect performance on either subtest did not permit the testing of the hypotheses because an experimental design was used which called for a repeated measures analysis of variance procedure.

Table 18

Sample for Experiment 2

Selection of sample	Male		Female		
	Grade				
	7th	8th	7th	8th	Total
Originally selected	111	15	110	16	252
Eliminated: special programs	10	0	11	0	21
Eliminated: improper administration	1	1	3	0	5
Eliminated: did not need help	25	3	15	6	49
Eliminated: additional testing facilities not available	15	0	16	0	31
Sample for statistical analyses	60	11	65	10	146

Near the end of the school term it became necessary to replace 31 Mar Vista Junior High School subjects with 31 eighth graders from National City Junior High School. Mar Vista did not have facilities to permit the four examiners to test simultaneously. The 31 Mar Vista subjects were eliminated randomly from those remaining in the original sample, while the 31 National City eighth grade subjects were selected randomly from a total of 108 eligible subjects. In Table 18 only the 31 subjects tested from National City appear; the 108 do not appear.

Examiners

Four graduate students, three male and one female, attending San Diego State College, served as examiners. All four were majoring in psychology, had completed graduate work in intelligence testing, and were working toward their master's degree. Three of the four examiners participated in Experiment 1. They began testing subjects for Experiment 2 at the same time. About half way through Experiment 2, the fourth examiner was employed. The examiners obtained the names of their subjects in exactly the same manner as described in Experiment 1.

Procedure

The BD and PA subtests from the WISC and WB were administered, and each subject received two administrations. During the first administration the experimental groups received help steps, while the control groups were administered the two subtests in the standard manner. During the second administration the alternate form of the test was administered, and no help steps were administered to either of the groups.

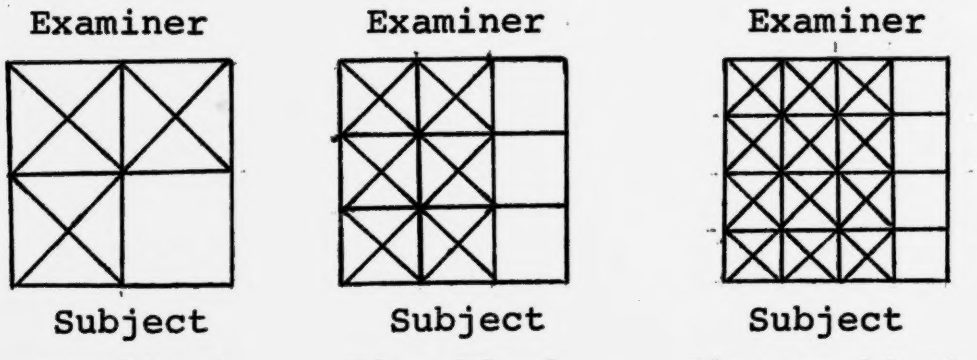
The subjects were divided into control and experimental groups. Four counterbalanced orders, shown in Table 19, were used to administer the two subtests. The subjects were assigned to one of the four counterbalanced orders and to either the experimental or control group. Eight conditions were therefore available.

Table 19

Counterbalanced Orders

Order	Administration 1
1	BD (WISC) followed by PA (WISC)
2	PA (WB) followed by BD (WB)
3	BD (WB) followed by PA (WB)
4	PA (WISC) followed by BD (WISC)
	Administration 2
1	BD (WB) followed by PA (WB)
2	PA (WISC) followed by BD (WISC)
3	BD (WISC) followed by PA (WISC)
4	PA (WB) followed by BD (WB)

When experimental subjects failed to complete items correctly, they received a series of specific, graduated help steps designed to facilitate successful completion of the items. Three help steps were designed for each subtest. For the BD subtest, the help steps were as follows: Step 1. *The subject* received 50% additional time beyond the time stated in the manual for completion of the design. Step 2. The examiner arranged the first column of blocks. Step 3. The examiner arranged the first column plus an additional number of blocks. The number of blocks arranged was as follows: Three of the four blocks for a four block design, six of nine blocks for a nine block design, and 12 of 16 blocks for a 16 block design. Figure 2 shows the arrangements of blocks for the third help step.



Four block Nine block Sixteen block

Fig. 2. Arrangement of blocks for help-step 3. The X in the diagram indicates the blocks arranged for the subject.

For the PA subtest the help steps were as follows: Step 1. The subjects received 50% additional time beyond the time stated in the manual for completion of the item. Step 2. The examiner arranged a specified number of cards. When the series contained three or four cards, the examiner arranged the first card. When the series contained five cards, the examiner arranged the first and second cards, and when the series contained six cards, the examiner arranged the first, second, and third cards. Step 3. The examiner arranged a greater number of cards than in Step 2, with the exception of the series containing three cards. For a three card series, the number of cards arranged by the examiner was the same as in Step 2, because if two cards were arranged in a three card series, only one card would remain for the subject to arrange. When the series contained four cards, the examiner arranged the first and second cards. When the series contained five cards, the examiner arranged the first, second, and third cards. When the series contained six cards, the examiner arranged the first, second, third, and fourth cards. Table 20 shows the number of cards arranged by the examiner for help steps two and three, the card numbers arranged by the examiner, and the order of the cards remaining after the help step had been set up. The order of the remaining cards was altered from the standard order on some items, because the remaining card order would solve the problem.

If the subject successfully completed the item after the first help step, the examiner presented the next item. If the subject was unable to complete the item after the first help step, the second help step was administered. If the subject was still unable to complete the item correctly, the third help step was administered.

Wechsler's (1944, 1949) discontinuance criteria were used during both the first and second administrations: Three consecutive failures on the WB BD, two consecutive failures on the WISC BD, no discontinuance on the WB PA, and two consecutive failures on the WISC PA.

Appendixes F, G, H, and I contain copies of the recording forms used in Experiment 2. Separate forms were used for each of the four subtests. The forms were arranged into four different orders corresponding to

Table 20

WB and WISC PA Card Order for Help-Step 2 and Help-Step 3

PA Step 2

Series	Number of cards in series	Correct order	Number of cards arranged by *E*	Card numbers arranged by *E*	Order of cards remaining
			WB		
1	3	2-1-3	1	2	3-1
2	4	2-3-4-1	1	2	1-3-4
3	4	2-3-4-1	1	2	1-3-4
4	5	4-1-3-5-2	2	4-1	2-3-5
5	6	5-4-1-6-2-3	3	5-4-1	2-3-6
6	6	2-4-6-5-1-3	3	2-4-6	1-3-5
			WISC		
A	3	3-2-1	1	3	1-2
B	3	2-3-1	1	2	1-3
C	4	2-4-1-3	1	2	1-4-3
D	3	1-3-2	1	1	2-3
1	4	4-3-1-2	1	4	1-2-3
2	4	3-1-4-2	1	3	1-2-4
3	4	4-3-1-2	1	4	1-2-3

(Table 20 continued next page)

Table 20--Continued

Series	Number of cards in series	Correct order	Number of cards arranged by E	Card numbers arranged by E	Order of cards remaining
			WISC		
4	4	2-4-3-1	1	2	1-3-4
5	5	2-4-1-5-3	2	2-4	1-3-5
6	6	5-3-4-2-6-1	3	5-3-4	1-2-6
7	6	5-2-4-6-1-3	3	5-2-4	1-3-6
			PA Step 3		
			WB		
1	3	2-1-3		2	3-1
2	4	2-3-4-1	2	2-3	1-4
3	4	2-3-4-1	2	2-3	1-4
4	5	4-1-3-5-2	3	4-1-3	2-5
5	6	5-4-1-6-2-3	4	5-4-1-6	3-2
6	6	2-4-6-5-1-3	4	2-4-6-5	3-1
			WISC		
A	3	3-2-1	1	3	1-2
B	3	2-3-1	1	2	1-3
C	4	2-4-1-3	2	2-4	3-1
D	3	1-3-2	1	1	2-3
1	4	4-3-1-2	2	4-3	2-1
2	4	3-1-4-2	2	3-1	2-4
3	4	4-3-1-2	2	4-3	2-1
4	4	2-4-3-1	2	2-4	1-3
5	5	2-4-1-5-3	3	2-4-1	3-5
6	6	5-3-4-2-6-1	4	5-3-4-2	1-6
7	6	5-2-4-6-1-3	4	5-2-4-6	3-1

the four counterbalanced orders. The recording forms were based upon the WISC and WB recording forms, and were modified to provide space for recording performance under the help-step condition. Appendixes J and K contain copies of the forms used for recording incorrect designs on the BD subtests. Incorrect design arrangements were recorded during the first and second administrations for all designs failed.

Each subject was tested individually in rooms provided by the schools. The examiner introduced himself to the subject with the following statement: "Hello, I am Mr. (Miss).... We are testing many students at the school and you were selected by a method something like having your name drawn out of a hat. We will be working on a number of things. Your scores will not be recorded on your school records and they will not affect your grades in any way. We would like you to do the best you can. Do you have any questions?" After the test was completed the examiner said: "Thank you for cooperating. Your performance was very good. No one is expected to get all the problems correct. The tests are new and we are just trying to learn how people perform on them. Thank you again for cooperating." These statements were designed to help diminish the child's anxieties.

Each examiner was provided with a specially prepared booklet containing instructions from the WB and WISC manuals, and instructions for administering the help steps. The specific instructions were as follows:

"Instructions for Picture Arrangement

Read instructions from manual. Discontinue after two consecutive failures on WISC, while on WB there is no discontinuance during the standard administration. A correct order is any one which receives credit. If the subject is in the Experimental group proceed as follows:

Administer Help-Step 1 as follows:

(a) If the subject is still working on the arrangement and time is up, say: '_Stop. The order of your pictures is not right. But I'm going to give you some more time to arrange them in their right order. Tell me when you are finished._'

Record performance; give 50% additional time. Pick up cards to record the arrangement; then present cards in the same arrangement to the subject as he had arranged them. (b) If the subject finishes the arrangement incorrectly before time is up, record time and arrangement and say: '*The order of your pictures is not right. But I'm going to give you some more time to arrange them in their right order. Tell me when you are finished.*' Give 50% additional time. Pick up cards to record the arrangement; then present cards in the same arrangement to the subject as he had arranged them. (c) If the subject stops working before the standard time limit is up, say: '*Please keep working until I tell you to stop.*' Then, if the design is incorrect, go to either part (a) or part (b) above, depending on the type of failure, and give those instructions.

Note: If the subject has a correct arrangement as a result of Help-Step 1 go to the next item unless subtest is to be discontinued. If the subject fails after Help-Step 1, proceed to Help-Step 2.

Help-Step 2.

Say: '*The order of your pictures is not right. I'm going to arrange the ... picture(s). Now, I want you to arrange them in their right order so as to make a sensible story. Tell me when you are finished.*' Arrange the appropriate number of cards. Allow the time limit in the standard presentation. The word *first* will be used in the directions when the examiner arranges the first card; the words *first and second* will be used when the examiner arranges two cards; and the words *first*, *second*, *and third* will be used when the examiner arranges three cards. In arranging the cards, the correct one(s) should be placed close to the subject while the remaining cards which are to be arranged should be placed above the correct one(s) and the placement should begin one card-space after the last correct one.

Note: If the subject finishes the arrangement incorrectly before time is up, record time and arrangement and proceed to Help-Step 3. If the subject stops working before the standard time is up, say: '*Please keep working until I tell you to stop.*' Then if the subject completes arrangement successfully go to next item unless subtest is to be discontinued; if unsuccessful, go to Help-Step 3.

Help-Step 3.

Say: '*The order of your pictures is still not right. So I'm going to arrange some more of the pictures. I will arrange the ... picture(s). Now I want you to arrange them in their right order so as to make a sensible story. Tell me when you are finished.*' Arrange the appropriate number of cards. Allow time limit in standard presentation.

The words *first*, *second*, *third*, *and fourth* will be used when the examiner arranges four cards.

In arranging the cards, the correct one(s) should be placed close to the subject, while the remaining cards which are to be arranged should be placed above the correct one(s) and the placement should begin one card space after the last correct one.

Proceed to next arrangement regardless of whether the subject is successful or not successful unless subtest is to be discontinued.

Instructions for Block Design

Read instructions from manual. Discontinue after two failures on WISC, three failures on WB during the standard administration.

If the subject is in experimental group proceed as follows:

Administer Help-Step 1 as follows:

(a) If the subject is still working on the design and time is up, say: '*Stop. Your design is not like the picture. But I'm going to give you some more time to finish it. Tell me when you are finished.*' Record performance; give 50% additional time.

(b) If the subject finishes the design incorrectly before time is up, record time and performance and say: '*Your design is not like the picture. But I'm going to give you some more time to finish it. Tell me when you are finished.*' Give 50% additional time.

(c) If the subject stops working before the standard time limit is up, say: '*Please keep working until I tell you to stop*.' Then, if design is incorrect, go to part (a) or part (b) above, depending on type of failure, and give those instructions.

Note: If the subject completes Help-Step 1 successfully go to next design unless subtest is to be discontinued. If the subject fails after Help-Step 1, proceed to Help-Step 2.

Help-Step 2.

Say: '*Your design is not like the picture. So I'm going to put together some of the blocks. I will make the left column. Now you go ahead and finish it. Look at the picture and make one just like it. Tell me when you are finished*.' Allow time limit in standard presentation. Construct only the left column regardless of the number of blocks in the design.

Note: If the subject finishes the design incorrectly before time is up, record time and performance and proceed to Help-Step 3. If the subject stops working before the standard time is up, say: '*Please keep working until I tell you to stop*.' Then if the subject completes design successfully go to next design unless subtest is to be discontinued; if unsuccessful, go to Help-Step 3.

Help-Step 3.

Say: 'Your design is still not like the picture. So I'm going to put together some more of the blocks. I will make the left column first, and will add some more blocks. (For four block design substitute: *and will add one more block* in place of *and will add some more blocks*; the latter is to be used only with nine and 16 block designs.) *Now you go ahead and finish it. Look at the picture and make one just like it. Tell me when you are finished*.' Allow time limit in standard presentation.

Note:

(a) For four-block design construct the left column and top row.
(b) For nine-block design construct the left and middle columns.

(c) For sixteen-block design construct left, middle, and next adjacent columns.
Proceed to next design regardless of whether the subject is successful or not successful unless subtest is to be discontinued. If the subject stops working before time is up, say: 'Please keep working until I tell you to stop.'"

Grades

Two sets of grades, by academic subject area, were obtained for each subject: (a) one set from June of 1966, and (b) one set from January of 1967. Mathematics, Social Studies, and English grades were available for all subjects for both time periods. The Social Studies grades included Geography and U. S. History for seventh and eighth graders. The June 1966 grades for seventh graders reflect their performance during the last semester of the sixth grade. For some subjects these sixth-grade grades were based on a three point scale, Superior, Average, Weak, as opposed to the five point A, B, C, D, F scale used in the seventh and eighth grades. In order to standardize the grading systems it was decided, after a discussion with an elementary school principal, to make the Superior grade equivalent to a B, the Average grade equivalent to a C, and the Weak grade equivalent to a D. Grades were also recorded for elective subject areas: Science, Spanish, Reading, Arts and Crafts, Handwriting, Spelling, Music, Shop, Homemaking, and Typing.

The grade point average (GPA) was determined by using all the grades obtained by the student during the semester. The subjects were tested during a two and one-half month period from the first week in April 1967 through the middle of June 1967. Thus the June 1966 grades represent those obtained at least eight months prior to the experiment, while the January 1967 grades represent those obtained approximately three months prior to the experiment.

5. Experiment 2--Results[1,2]

The subtest scores were evaluated by a four factor analysis of variance design using condition and sex as the two independent factors, and administration and subtest as the two repeated factors. The means for these factors appear in Table 21, and the results of the analysis of variance are presented in Table 22. Three significant Fs were found which indicate the following: (a) The experimental group achieved significantly higher overall scores than the control group; thus the help steps improved the subjects' performance. (b) Higher scores were obtained on the second administration than on the first administration. (c) Higher scores were obtained on the BD subtest than on the PA subtest. (d) Because none of the interactions were significant, the results also indicate that the experimental group achieved significantly higher scores than the control group on both the first and second administrations, and that both the experimental and control groups obtained significantly higher scores on the second administration on both subtests.

The difference among the scores obtained by the four examiners was evaluated by a four factor analysis of variance design employing condition and examiner as the two independent factors, and administration and subtest as the two repeated factors. Table 23 presents the means for these factors, and Table 24 presents the results of the analysis of variance. The subjects achieved higher overall scores on the second administration than on the first administration, and BD scores were higher than the PA scores. Because of the nonsignificant subtest by administration factor, the BD scores were significantly higher than the PA on both the first and second administrations. The examiner factor was not significant. While the results presented in Table 22 show that the condition factor was significant, Table 24 shows that the condition factor was not significant.

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[1] Appendix L, Table 45, contains the raw data for the variables of Experiment 2.

[2] All of the analyses of variance in Experiment 2 employed the unweighted means analysis procedure because of unequal cell frequencies.

Table 21

Mean BD and PA Scores for Conditions, Sex, and Administrations

Subtest	Control						Experimental					
	Male (N = 33)		Female (N = 36)		Total (N = 69)		Male (N = 38)		Female (N = 39)		Total (N = 77)	
	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
PA	8.64	9.58	8.08	9.14	8.36	9.36	9.89	11.00	8.64	10.20	9.27	10.60
BD	8.73	10.18	9.28	10.80	9.00	10.49	9.47	11.50	9.28	10.79	9.38	11.15
Total	8.68	9.88	8.68	9.97	8.68	9.92	9.68	11.25	8.96	10.50	9.32	10.88

Table 22

Analysis of Variance of BD and PA Scores for Conditions, Sex, Administrations, and Subtests

Source	*df*	*MS*	*F*
Between Subjects			
Conditions (A)	1	92.03	6.40*
Sex (B)	1	17.31	1.20
A X B	1	22.25	1.54
Error (between)	142	14.37	
Within Subjects			
Subtests (C)	1	53.83	7.86**
A X C	1	11.48	1.67
B X C	1	24.98	3.64
A X B X C	1	2.32	.34
C X Subjects	142	6.84	
Administrations (D)	1	284.26	62.01***
A X D	1	3.44	.75
B X D	1	.04	0.00
A X B X D	1	.13	.02
D X Subjects	142	4.58	
C X D	1	7.83	1.92
A X C X D	1	.03	0.00
B X C X D	1	2.34	.57
A X B X C X D	1	1.96	.48
CD X Subjects	142	4.08	

$^{*}p < .05$.
$^{**}p < .01$.
$^{***}p < .001$.

Table 23

Mean BD and PA Scores for Examiners, Conditions, and Administrations

Subtest	Examiner 1				Examiner 2				Examiner 3	
	Control		Exper.		Control		Exper.		Control	
	(N = 17)		(N = 23)		(N = 12)		(N = 12)		(N = 18)	
	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
PA	8.76	9.70	9.04	10.83	8.25	9.67	9.25	10.67	8.17	10.06
BD	9.94	11.70	9.83	12.26	9.50	10.75	9.25	11.42	8.83	10.22
Total	9.35	10.70	9.43	11.54	8.88	10.21	9.25	11.04	8.50	10.14

	Examiner 3		Examiner 4				Total			
	Exper.		Control		Exper.		Control		Exper.	
	(N = 23)		(N = 22)		(N = 19)		(N = 69)		(N = 77)	
	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
PA	10.09	10.87	8.23	8.32	8.53	9.95	8.35	9.44	9.23	10.58
BD	9.61	10.91	8.18	9.68	8.63	9.89	9.11	10.59	9.33	11.12
Total	9.85	10.89	8.20	9.00	8.58	9.92	8.73	10.01	9.28	10.85

Table 24

Analysis of Variance of BD and PA Scores for Conditions, Examiners, Administrations, and Subtests

Source	*df*	*MS*	*F*
Between Subjects			
Conditions (A)	1	65.45	1.86
Examiners (B)	3	43.56	1.24
A X B	3	2.19	.06
Error (between)	138	35.01	
Within Subjects			
Subtests (C)	1	56.31	8.08*
A X C	1	13.82	1.98
B X C	3	10.29	1.47
A X B X C	3	.13	.01
C X Subjects	138	6.96	
Administrations (D)	1	279.15	61.24**
A X D	1	2.91	.63
B X D	3	2.81	.61
A X B X D	3	3.13	.68
D X Subjects	138	4.55	
C X D	1	5.95	1.43
A X C X D	1	.02	0.00
B X C X D	3	.93	.22
A X B X C X D	3	3.11	.75
CD X Subjects	138	4.13	

*$p < .01$.
**$p < .001$.

The experimental treatment was significant when sex was employed as a factor in the analysis of variance (see Table 22), but not when the examiner was used (see Table 24). Possible reasons for the noncorroborating results are as follows: First, Tables 22 and 24 show that the between error term is lower in the analysis using sex as a factor than in the analysis using examiner as a factor. Second, the condition factor accounts for a larger proportion of the variance when the sex factor is used than when the examiner factor is used. Third, the examiner factor accounts for a larger proportion of the variance than does the sex factor in the respective analyses. Thus, a more sensitive test of the condition factor resulted when sex was employed as a factor than when the examiner factor was used.

The hypotheses that violation of standard procedures by administering help steps has no effect on the scores obtained on either the first or second administrations are not supported by the data of Table 22. Thus help alters the BD and PA performance on both the initial and repeated test. The hypothesis is supported, however, which stated that the scores obtained by different examiners do not differ.

The effect of order of administration was evaluated by a three factor analysis of variance design. The eight condition by orders of administration was the independent factor, and administration (first and second) and subtest (BD and PA) were the repeated factors. The eight levels of the independent factor were the four orders of administration for the experimental group plus the four orders of administration for the control group. One administration order, for example, was as follows: for the first administration, WISC BD followed by WISC PA; for the second administration, WB BD followed by WB PA. The four orders of administration are presented in Table 19. The means for the factors are presented in Table 25, and the analysis of variance is summarized in Table 26. The condition by order factor was not significant. The administration factor, subtest factor, and the condition by order by subtest interaction were significant. The results again indicate that the subjects obtained higher scores on the second than on the first administration.

The significant interaction indicates that on certain orders of administration the difference between the PA and BD subtests was not significant; however,

Table 25

Mean BD and PA Scores for Condition by Orders and Administrations

Control

Subtest	WISC BD First (N = 16)		WB PA First (N = 18)		WB BD First (N = 15)		WISC PA First (N = 20)	
	1st	2nd	1st	2nd	1st	2nd	1st	2nd
PA	9.50	9.25	7.28	11.33	8.73	9.07	8.10	7.85
BD	8.75	9.75	9.56	11.56	8.73	11.40	8.95	9.50
Total	9.12	9.50	8.42	11.44	8.73	10.23	8.52	8.68

Experimental

	WISC BD First (N = 21)		WB PA First (N = 22)		WB BD First (N = 15)		WISC PA First (N = 19)		Total (N = 146)	
	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
PA	9.90	11.38	9.18	11.59	8.00	10.13	9.63	8.95	8.79	9.94
BD	9.57	10.76	9.54	12.04	8.60	11.20	9.58	10.47	9.16	10.84
Total	9.74	11.07	9.36	11.82	8.30	10.67	9.60	9.71	8.98	10.39

Table 26

Analysis of Variance of BD and PA Scores for Condition by Orders, Administrations, and Subtests

Source	df	MS	F
Between Subjects			
Condition by orders (A)	7	28.59	1.30
Error (between)	138	21.92	
Within Subjects			
Subtests (B)	1	56.92	8.22*
A X B	7	7.54	1.08
B X Subjects	138	6.92	
Administrations (C)	1	286.23	80.91**
A X C	7	23.00	6.50**
C X Subjects	138	3.53	
B X C	1	9.76	2.54
A X B X C	7	7.98	2.07
BC X Subjects	138	3.83	

*$p < .01$.
**$p < .001$.

overall, the subjects obtained higher scores on the BD subtest than on the PA subtest. Individual mean comparisons were made between the PA and BD subtests for each of the eight condition by orders. The means used for the t tests were the total means for each subtest; i.e., the mean of the first plus second administrations. The results appear in Table 27. The significant interaction reflects the control subjects' significantly higher BD than PA scores on the two orders having the WB first, and the experimental group's higher BD than PA scores on one order which had the WISC administered first. The results of the individual mean comparisons suggest that under standard administrative procedures (i.e., results derived from the control group) there is a greater disparity between the PA and BD subtest scores when the WB is administered during the initial administration and followed by the WISC in the repeated administration than when the WISC is first administered and followed by the WB. In the experimental group, a significant difference between BD and PA also occurs when the WB is administered first, as well as when the WISC BD is administered first.

Two Scheffé tests were conducted to evaluate whether the subtest means were similar for each form. The average of the four WISC means (first and second administration plus two orders) was compared to the average of the four WB means separately for each subtest. Both Scheffé tests were not significant (for BD, $t = .67$, $df = 138$, $p > .05$; for PA, $t = .11$, $df = 138$, $p > .05$). Thus the two test forms produced means which were not significantly different.

The number of items on which help was administered was evaluated in relation to the order of administration, subtests, and examiners. Only the experimental group was used in the analysis because the control group did not receive help. Table 28 presents the means for the factors, and Table 29 presents the summary of the analysis of variance. A three factor design was used with order and examiner as the two independent factors and administration as the repeated factor. Three significant Fs appear: the examiner factor, order factor, and examiner by order interaction. The four examiner means within each order were tested by use of the Newman-Keuls procedure. The results indicate that there are no significant differences among the four examiners' means when the WISC BD or WB PA were administered first. However, when the WB BD was administered first, examiner 4's mean was significantly higher than the three other examiners' means; the means for examiners 1, 2, and 3,

Table 27

Individual Mean Subtest Comparisons Within Each Condition by Order Administration

Condition by order	df	t
Control WISC BD first	30	.79
Control WB PA first	34	6.71*
Control WB BD first	28	3.06*
Control WISC PA first	38	.38
Experimental WISC BD first	40	3.24*
Experimental WB PA first	42	6.15*
Experimental WB BD first	28	4.83*
Experimental WISC PA first	36	.25

Note.--See Table 19 for a complete description of the orders.

*$p < .01$.

Table 28

Mean Help Items for Experimental Condition for Orders, Subtests, and Examiners

	WISC		WB		WB		WISC		
	BD First		PA First		BD First		PA First		
	(N = 18)		(N = 22)		(N = 12)		(N = 16)		
Examiner	BD	PA	BD	PA	BD	PA	BD	PA	Total
1 (N = 22)	3.00	1.50	1.82	1.82	1.83	2.33	1.33	.67	1.79
2 (N = 10)	1.00	3.00	1.50	1.50	2.00	2.00	1.67	2.33	1.87
3 (N = 21)	2.10	1.70	1.43	2.00	2.00	2.00	2.33	2.00	1.94
4 (N = 15)	2.20	2.00	2.00	1.50	3.00	4.00	2.43	2.00	2.39
Total (N = 68)	2.07	2.05	1.69	1.70	2.21	2.58	1.94	1.75	2.00

Table 29

Analysis of Variance of Help Items for Examiners, Orders, and Subtests

Source	df	MS	F
Between Subjects			
Examiners (A)	3	1.40	2.98*
Orders (B)	3	1.79	3.82*
A X B	9	1.00	2.14*
Error (between)	52	.47	1.00
Within Subjects			
Subtests (C)	1	.04	.07
A X C	3	.99	1.74
B X C	3	.27	.48
A X B X C	9	.85	1.49
Error (within)	52	.57	1.00

*$p < .05$.

in contrast, were not significantly different from one another. When the WISC PA was administered first, the mean of examiner 1 was significantly lower than the means of the other three examiners. The results indicate that one of the four examiners gave help on more items than the other three examiners in one order, and a different examiner gave help on fewer items than the other three examiners in another order.

A three factor analysis of variance design was used to evaluate the number of help steps administered by the examiners. Help steps differ from help items because on any specific item up to three help steps could be administered; thus the number of help steps can be the same as or larger than the number of help items. Table 30 presents the means for examiners, orders, and subtests, and Table 31 presents the results of the analysis of variance. Examiner and order were the two independent factors, and subtest was the repeated factor. None of the $\underline{F}$ tests reached significance. These results indicate that the number of help steps was equally distributed among the examiners, orders, and subtests. The data in Tables 28 and 30 indicate that almost one third more help steps were administered than help items.

Age differences in the eight condition by orders of administration and in the sexes were evaluated by use of a two-way factorial analysis of variance design. The means for the factors appear in Table 32, and Table 33 presents the results of the analysis of variance. None of the $\underline{F}$s reached significance.

The ability level of the subjects, as determined by SCAT scores, was evaluated by two separate three-way analyses of variance, and each had the SCAT scales (V and Q) as the repeated measure. In the first analysis, condition and examiner were used as the independent factors. Table 34 presents the mean SCAT scores, and Table 35 presents the results of the analysis of variance. The condition factor was not significant; thus, the subjects in the experimental and control conditions had equal ability. The significant examiner factor indicates that the ability level of the subjects differed among the four examiners. A Newman-Keuls analysis revealed that the subjects tested by examiner 2 had significantly lower ability than the subjects tested by examiners 1 and 3, but not significantly lower than examiner 4's subjects. The significant SCAT scale factor indicates that the subjects achieved higher SCAT Q than SCAT V scores.

Table 30

Mean Help Steps for Experimental Condition for Orders, Subtests, and Examiners

	WISC		WB		WB		WISC		
	BD First		PA First		BD First		PA First		
	(N = 18)		(N = 22)		(N = 12)		(N = 16)		
Examiner	BD	PA	BD	PA	BD	PA	BD	PA	Total
1 (N = 22)	4.00	1.50	2.54	3.09	3.00	3.50	1.67	1.00	2.54
2 (N = 10)	2.00	5.00	2.50	1.50	2.75	3.50	2.00	3.33	2.82
3 (N = 21)	3.00	2.70	2.28	3.28	3.00	3.00	4.33	3.67	3.16
4 (N = 15)	3.40	4.20	3.00	4.00	6.00	4.00	3.43	3.28	3.91
Total (N = 68)	3.10	3.35	2.58	2.97	3.69	3.50	2.86	2.82	3.11

Table 31

Analysis of Variance of Help Steps for Examiners, Orders, and Subtests

Source	*df*	*MS*	*F*
Between Subjects			
Examiners (A)	3	6.85	2.67
Orders (B)	3	2.80	1.09
A X B	9	2.29	.89
Error (between)	52	2.57	1.00
Within Subjects			
Subtests (C)	1	.21	.10
A X C	3	2.08	1.02
B X C	3	.33	.16
A X B X C	9	2.78	1.37
Error (within)	52	2.03	1.00

Table 32

Mean Ages in Months for Sex and Condition by Orders

	Male		Female		Total	
Condition by order	N	Mean	N	Mean	N	Mean
Control WISC BD first	8	158.00	8	158.12	16	158.06
Control WB PA first	8	161.00	10	159.90	18	160.45
Control WB BD first	8	154.38	7	157.57	15	155.97
Control WISC PA first	9	159.67	11	157.64	20	158.65
Experimental WISC BD first	9	160.33	12	159.58	21	159.96
Experimental WB PA first	12	159.83	10	158.80	22	159.32
Experimental WB BD first	7	156.57	8	158.38	15	157.47
Experimental WISC PA first	10	159.00	9	158.22	19	158.61

Note.--See Table 19 for a complete description of the orders.

Table 33

Analysis of Variance of Age for Condition by Orders and Sex

Source	df	MS	F
Between Subjects			
Condition by orders (A)	7	36.14	.58
Sex (B)	1	.44	.01
A X B	7	13.30	.21
Error (between)	130	62.15	

Table 34

Mean SCAT Scores for Conditions, Examiners, and SCAT Scales

SCAT Scale	Examiner	Control	N	Experi-mental	N	Total	N
V	1	260.74	19	259.52	21	260.13	40
	2	257.00	18	256.83	6	256.92	24
	3	258.29	17	258.88	24	258.58	41
	4	257.71	17	258.42	24	258.06	41
Q	1	268.68	19	267.38	21	268.03	40
	2	265.39	18	264.67	6	265.03	24
	3	269.06	17	271.21	24	270.13	41
	4	269.53	17	268.21	24	268.87	41
Total	1	264.71	19	263.45	21	264.08	40
	2	261.19	18	260.75	6	260.97	24
	3	263.68	17	265.04	24	264.36	41
	4	263.62	17	263.31	24	263.46	41

Table 35

Analysis of Variance of SCAT Scores for Conditions, Examiners, and SCAT Scales

Source	df	MS	F
Between Subjects			
Conditions (A)	1	1.53	.04
Examiners (B)	3	145.70	3.78*
A X B	3	18.85	.49
Error (between)	138	38.59	1.00
Within Subjects			
SCAT scales (C)	1	5625.72	114.91**
A X C	1	0.00	0.00
B X C	3	52.98	1.08
A X B X C	3	8.66	.18
Error (within)	138	48.96	1.00

*$p < .05$.
**$p < .01$.

The second analysis of variance of SCAT scores used sex as a factor instead of examiner. The means are presented in Table 36, and the results of the analysis of variance appear in Table 37. Condition and sex were not significant. The SCAT scale factor was again significant, and indicates that the SCAT Q scores were higher than the SCAT V scores.

Intercorrelations among the variables common to all subjects in Experiment 2 appear in Table 38.[3,4] All correlations using the nine subtest scores in Table 38 are not "pure" measures because the total group is composed of the experimental and control groups. Table 39 presents the intercorrelation matrix for the experimental group, and Table 40 for the control group. Table 41 presents the correlations between elective subject areas and the variables common to all subjects taking the elective areas for the combined control and experimental groups. Tables 42 and 43 present the same variables as Table 41 separately for the experimental and control subtests. Because of missing data, 26 subjects were not included in the intercorrelation matrices.

As in Experiment 1, all correlations in the tables using the SCAT scales and the SCAT total score are corrected for restricted range of talent. The uncurtailed standard deviations were obtained for the entire eighth grade Mar Vista Junior High School class and for the seventh and eighth grade classes of National City Junior High School. Since there was little difference among the standard deviations for each SCAT scale and for the SCAT total score in the grades and schools, an average standard deviation was used for each SCAT scale and SCAT total score to represent the uncurtailed sample. The standard deviation used for each SCAT

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[3] The following abbreviations and terms, not previously indicated, are used in Tables 38 through 43: Total Admin. 1 = the sum of the BD and PA scores for the first administration; Total Admin. 2 = the sum of the BD and PA scores for the second administration; Total Score = the sum of all subtest scores obtained on the first and second administrations; Total BD = the sum of the BD scores obtained on the first and second administrations; Total PA = the sum of the PA scores obtained on the first and second administrations; Hdwg. = Handwriting. See footnote 3, Part 3, for a description of other abbreviations.

[4] Correlations appearing in the tables of Experiment 2 are with the decimal point removed.

Table 36

Mean SCAT Scores for Conditions, Sex, and SCAT Scales

	Control		Experimental		Total	
SCAT Scale	Male (N = 33)	Female (N = 36)	Male (N = 38)	Female (N = 39)	Male (N = 71)	Female (N = 75)
V	258.45	259.75	258.50	257.82	258.48	258.78
Q	268.36	268.61	267.95	268.69	268.16	268.65
Total	263.41	264.18	263.22	263.26	263.32	263.72

Table 37

Analysis of Variance of SCAT Scores for Conditions, Sex, and SCAT Scales

Source	*df*	*MS*	*F*
Between Subjects			
Conditions (A)	1	19.63	.49
Sex (B)	1	11.27	.28
A X B	1	13.81	.34
Error (between)	142	40.36	
Within Subjects			
SCAT Scales (C)	1	6941.62	142.03*
A X C	1	15.63	.32
B X C	1	2.54	.05
A X B X C	1	22.90	.47
Error (within)	142	48.87	

*$p < .001$.

scale and the SCAT total score was a weighted average of the standard deviations for each class taking into account the number of subjects in each school and class. The SCAT means and standard deviations in Tables 38, 39, and 40 are those of the subjects participating in the study.

The data of Table 38 which is based upon the total group shows that the nine scores obtained from the two subtests are all significantly positively intercorrelated. The lowest significant correlations are between BD and PA. Because the total scores are composed of the respective parts (e.g., total first administration is composed of first administration BD and PA scores) there are many high intercorrelations between the total scores and subtest scores.

The matrix shows that the SCAT total score correlates significantly with all of the individual and combined subtest scores. The SCAT Q score also correlates significantly with all subtest scores with the exception of the PA first administration score. The SCAT V score, however, only correlates significantly with four of the nine subtest scores: PA first administration, total first administration, total score, and total PA score.

The PA scores obtained on the first administration are not significantly correlated with any grades shown in Table 38 or with the GPAs, while the PA scores obtained on the second administration are only significantly correlated with Social Studies 1/67. In contrast, the BD scores are significantly correlated with a number of grades and with GPA. The BD scores obtained on the first administration are significantly correlated with both GPAs, both English grades, Social Studies 6/66, and Mathematics 1/67. The BD scores obtained on the second administration are significantly correlated with GPA 6/66, English 6/66, and Social Studies 6/66.

The total first administration scores are significantly correlated with both English grades, Social Studies 1/67, and Mathematics 1/67. The total second administration scores are significantly correlated with GPA 6/66, and with the two Social Studies grades.

The total subtest score (first plus second administrations of both subtests) is significantly correlated with GPA 6/66, English 6/66, and with the two Social Studies grades. The total BD score is significantly correlated with GPA 6/66, English 6/66, and Social Studies 6/66. The total PA is significantly correlated with Social Studies 1/67.

Table 38

Intercorrelation Matrix for Variables Common to All Subjects in Experiment 2 (N = 120)

		1	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
PA Admin. 1	1.	-	25	15	16	75	26	55	17	74	35	-08	24	-01
PA Admin. 2	2.		-	17	22	28	77	64	22	83	06	31	35	05
BD Admin. 1	3.			-	61	76	51	71	88	21	13	34	45	15
BD Admin. 2	4.				-	52	79	77	92	25	04	43	45	25
Total Admin. 1	5.					-	51	84	70	63	33	18	45	09
Total Admin. 2	6.						-	90	74	69	06	47	49	19
Total Score	7.							-	82	76	21	39	52	17
Total BD	8.								-	26	11	43	49	23
Total PA	9.									-	26	18	37	03
SCAT (V)	10.										-	-06	90	58
SCAT (Q)	11.											-	84	62
SCAT (T)	12.												-	84
G.P.A. 6/66	13.													-
G.P.A. 1/67	14.													
English 6/66	15.													
Soc. St. 6/66	16.													
Math. 6/66	17.													
English 1/67	18.													
Soc. St. 1/67	19.													
Math. 1/67	20.													
Age	21.													

(Table 38 continued next page)

Table 38--Continued

		14.	15.	16.	17.	18.	19.	20.	21.	Mean	SD
PA Admin. 1	1.	04	07	05	04	07	11	06	00	8.86	2.35
PA Admin. 2	2.	05	-01	12	-10	-06	16	-05	11	9.97	2.86
BD Admin. 1	3.	16	18	17	06	15	10	17	-21	9.27	2.37
BD Admin. 2	4.	07	21	23	07	05	07	09	-05	10.87	2.93
Total Admin. 1	5.	13	16	14	06	15	15	15	-14	18.12	3.59
Total Admin. 2	6.	07	13	23	-02	-01	15	02	04	20.83	4.54
Total Score	7.	11	17	22	02	07	17	09	-05	38.96	7.08
Total BD	8.	12	22	23	07	10	09	14	-14	20.12	4.77
Total PA	9.	05	03	11	-05	00	18	00	08	18.82	4.14
SCAT (V)	10.	46	44	60	30	30	54	46	-43	259.12	5.91
SCAT (Q)	11.	51	51	61	59	36	40	50	-15	268.22	7.26
SCAT (T)	12.	74	74	83	72	57	74	72	-47	265.61	4.03
G.P.A. 6/66	13.	53	78	77	69	46	45	50	-17	2.35	.54
G.P.A. 1/67	14.	-	48	47	42	79	76	73	-21	2.25	.61
English 6/66	15.		-	67	54	47	37	43	-21	2.32	.65
Soc. St. 6/66	16.			-	59	38	43	44	-09	2.29	.68
Math. 6/66	17.				-	35	37	48	-23	2.19	.76
English 1/67	18.					-	57	47	-20	2.19	.89
Soc. St. 1/67	19.						-	48	-18	1.98	.88
Math. 1/67	20.							-	-21	2.08	.88
Age	21.								-	159.28	8.03

Note.--For a one-tailed test with N = 120, significance is indicated at the .05 level when r = .15 and at the .01 level when r = .21.

The SCAT scale scores correlate significantly with both GPAs and with all subject areas. However, there is a nonsignificant relationship between SCAT V and SCAT Q.

All subject area grades and GPAs are highly significantly intercorrelated.

Age is significantly negatively correlated with BD first administration, SCAT Q, SCAT V, and SCAT total score, both GPAs, both English grades, both Mathematics grades, and Social Studies 1/67 grades.

Table 39 presents the same variables used for the intercorrelations shown in Table 38, but only for the experimental group. For the total group presented in Table 38 (experimental plus control) all correlations between the subtest scores were significant. In contrast, Table 39 shows that there are ten nonsignificant relationships among the subtest scores. Four of the nonsignificant correlations are related to the PA scores obtained on the first administration. PA first administration scores do not significantly correlate with BD first administration, BD second administration, total second administration, and total BD. PA second administration is a variable in three of the nonsignificant correlations: BD first administration, BD second administration, and total BD. PA total is a variable in the remaining three nonsignificant relationships: BD first administration, BD second administration, and total BD. In the experimental group, then, PA and BD scores do not significantly intercorrelate.

For the experimental group, the correlations between the nine scores derived from the two subtests and the SCAT scores range from numerous highly significant ones to two nonsignificant negative correlations. The SCAT V scale correlates significantly with PA first, PA second, PA total, total first administration, total second administration, and total score. The SCAT V scale is not significantly correlated with any of the individual BD scores or with the total BD score. The SCAT Q scale correlates significantly with PA second administration, BD first administration, BD second administration, total second administration, total score, and total BD score. Thus the SCAT V scale correlates with the PA scores, but not with the BD scores; while the SCAT Q scale correlates with only one of the individual PA scores, but with all three BD scores. The SCAT total score significantly correlates with all nine scores involving the two subtests.

Table 39

Intercorrelation Matrix for Variables Common to All Experimental Subjects in Experiment 2 (N = 67)

	PA Admin. 1 1.	PA Admin. 2 2.	BD Admin. 1 3.	BD Admin. 2 4.	Total Admin. 1 5.	Total Admin. 2 6.	Total Score 7.	Total BD 8.	Total PA 9.	SCAT (V) 10.	SCAT (Q) 11.
1.	-	29	06	00	70	18	48	03	76	49	-19
2.		-	11	16	27	74	61	15	84	46	33
3.			-	63	76	50	71	88	11	17	34
4.				-	45	79	74	92	11	-13	47
5.					-	47	82	65	58	45	12
6.						-	89	72	60	21	52
7.							-	80	68	37	41
8.								-	12	02	45
9.									-	57	12
10.										-	-26
11.											-
12.											
13.											
14.											
15.											
16.											
17.											
18.											
19.											
20.											
21.											
22.											
23.											
24.											
25.											
26.											
27.											

(Table 39 continued next page)

Table 39--Continued

	SCAT (T) 12.	G.P.A. 6/66 13.	G.P.A. 1/67 14.	English 6/66 15.	Soc. St. 6/66 16.	Math. 6/66 17.	English 1/67 18.	Soc. St. 1/67 19.	Math. 1/67 20.	Help Items PA 21.
1.	22	-13	11	01	-04	-06	04	22	04	-50
2.	67	12	19	02	31	-02	09	32	01	-28
3.	52	12	08	19	15	03	07	01	27	09
4.	45	12	07	10	19	08	02	04	22	01
5.	51	00	13	15	08	-02	08	15	22	-27
6.	68	16	17	08	32	04	07	22	16	-17
7.	67	10	18	13	25	01	09	22	22	-25
8.	52	13	09	16	19	06	05	03	27	05
9.	59	01	20	02	18	-05	08	34	03	-48
10.	88	51	45	37	61	-02	26	51	37	-24
11.	81	58	48	38	59	56	38	31	52	09
12.	-	83	74	64	85	57	57	67	72	-12
13.		-	61	77	73	66	53	45	60	28
14.			-	55	46	41	78	76	73	00
15.				-	65	55	49	39	53	19
16.					-	52	34	41	48	08
17.						-	31	29	48	19
18.							-	52	46	05
19.								-	47	-15
20.									-	17
21.										-
22.										
23.										
24.										
25.										
26.										
27.										

(Table 39 continued next page)

Table 39--Continued

	Help Steps PA 22.	Help Items BD 23.	Help Steps BD 24.	Total Help Items 25.	Total Help Steps 26.	Age 27.	Mean	SD
1.	-32	-03	02	-34	-16	08	9.37	2.19
2.	-20	-05	-04	-22	-14	-02	10.51	2.63
3.	-04	-77	-71	-54	-56	-18	9.40	2.39
4.	-09	-37	-58	-28	-49	-07	11.25	2.87
5.	-24	-57	-50	-61	-51	-07	18.78	3.34
6.	-18	-29	-42	-33	-42	-07	21.76	4.19
7.	-24	-48	-53	-53	-54	-08	40.54	6.47
8.	-07	-61	-71	-44	-58	-14	20.64	4.75
9.	-31	-05	-02	-34	-18	03	19.88	3.88
10.	-34	-15	-08	-28	-24	-26	258.64	5.89
11.	06	-21	-18	-10	-10	-03	268.33	8.03
12.	-22	-39	-26	-37	-31	-19	265.42	4.04
13.	16	-08	-03	12	05	-26	2.31	53.69
14.	-05	-07	00	-06	-03	-16	2.09	62.78
15.	10	-14	-10	00	-04	-18	2.27	6.87
16.	04	-17	-14	-08	-10	-09	2.22	7.14
17.	17	04	01	15	09	-23	2.12	7.49
18.	07	-03	08	00	09	-19	2.04	9.44
19.	-17	-05	02	-14	-08	-16	1.90	9.07
20.	03	-18	-16	-03	-11	-13	1.87	8.86
21.	73	00	-07	62	33	-17	1.96	6.84
22.	-	18	17	60	65	-14	2.91	12.40
23.		-	81	78	71	13	1.91	8.48
24.			-	59	86	04	3.13	17.91
25.				-	77	00	3.87	10.86
26.					-	-04	6.03	2.34
27.						-	159.51	8.09

Note.--For a one-tailed test with N = 67, significance is indicated at the .05 level when *r* = .20 and at the .01 level when *r* = .28.

The correlations in Table 39 between the nine scores involving the two subtests and GPA, and between the former and grades are generally not significant; when significant, they are below .35. The total score is the best predictor of grades because it significantly correlates with more variables than any of the other subtest scores. The total score is significantly correlated with the two Social Studies grades and Mathematics 1/67. The total second administration is significantly related to the two Social Studies grades. The total PA is significantly related to Social Studies 1/67 and GPA 1/67. The total first administration is significantly related to Mathematics 1/67. The BD first administration, BD second administration, and BD total are significantly related to Mathematics 1/67. The PA first administration is significantly related to Social Studies 1/67, and the PA second administration is significantly related to the two Social Studies grades. Social Studies 1/67 and Mathematics 1/67 are the two subject areas having the largest number of significant correlations with the various subtest scores.

The correlations in Table 39 between the total number of help items administered and the nine scores involving the two subtests are all significant and in the negative direction. The correlations among the total number of help steps and subtest scores produced six significant negative correlations; the nonsignificant ones involved the PA first administration, PA second administration, and PA total score.

The correlations between the SCAT scores and help items, and between the former and help steps are usually negative and significant. The SCAT total score is significantly negatively related to five of the six help scores. Thus the more help needed, the lower the SCAT total score.

The correlations between help scores (help items and help steps) and grades are not significant. There is, however, a significant relationship (.28) between PA help items and GPA 6/66. The correlations among the six help scores are usually positive and significant. The only nonsignificant correlations are between the two PA help scores and the two BD help scores. The hypothesis that there is no relationship between cues and test performance is rejected by the correlations involving help scores. Lower subtest scores are associated with a greater number of help items and help steps. However, the help scores on the BD are not significantly related to PA help scores.

The SCAT V and Q scales in the experimental group are significantly negatively correlated. The correlations between the SCAT scales and GPAs, and between the former and grades are very strong and significant in all cases shown in Table 39, except for the nonsignificant relationship between SCAT V and Mathematics 6/66. Of the three SCAT scores, the SCAT total score has the highest correlation with grades and GPAs.

The correlations among the core subject area grades are all significant, and show a strong degree of relationship.

Age for the experimental group is significantly negatively correlated with SCAT V, GPA 6/66, and Mathematics 6/66, while no other correlations involving age are significant.

Table 40 presents the variables common to all control group subjects. The correlations among the nine scores involving the two subtests are all significant and positive except for the nonsignificant correlation between PA first administration and PA second administration.

The correlations in the control group between the nine scores involving the two subtests and the three SCAT scores are generally significant. Four of the subtest scores are significantly positively correlated with the SCAT V scale: PA first administration, BD second administration, total first administration, and total BD. The relationship between SCAT V and PA second administration is highly significant, but in a negative direction. The SCAT Q scale is significantly positively related to eight of the nine subtest scores; the one exception is a nonsignificant correlation with PA first administration. Two subtest scores do not significantly correlate with the SCAT total score: PA second administration and total PA.

There are many significant correlations in the control group between the nine scores involving the two subtests and GPAs, and between the former and the core subject area grades. PA first administration is significantly related to Social Studies 6/66, English 1/67, and Mathematics 1/67. PA second and PA total are not related to any of the GPAs or to core subject area grades. BD first administration is significantly related to GPA 1/67, English 1/67, and Social Studies 1/67. BD second administration is significantly related to GPA 6/66, English 6/66, and Social Studies 6/66. The total first administration is significantly related to both GPAs, both English grades, Social

Table 40

Inercorrelation Matrix for Variables Common to All ontrol Group Subjects in Experiment 2 (N = 53)

		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
PA Admin 1	1.	-	14	24	29	79	23	58	30	69	33	09	37	17
PA Admin 2	2.		-	24	25	24	80	63	27	82	-31	30	-05	03
BD Admin 1	3.			-	60	78	53	74	87	32	13	34	37	21
BD Admin 2	4.				-	56	78	79	92	35	31	36	49	44
Total Adin. 1	5.					-	51	83	74	64	29	29	45	24
Total Adin. 2	6.						-	90	75	74	00	41	29	29
Total Score	7.							-	86	80	15	39	41	31
Total BD	8.								-	37	25	39	49	38
Total PA	9.									-	-04	29	19	12
SCAT (V)	10.										-	25	93	65
SCAT (Q)	11.											-	90	70
SCAT (T)	12.												-	85
G.P.A. 6/66	13.													-
G.P.A. 1/67	14.													
English 6/66	15.													
Soc. St. 6/66	16.													
Math. 6/6	17.													
English 1/67	18.													
Soc. St 1/67	19.													
Math. 1/7	20.													
Age	21.													

(Table 40 continued next page)

Table 40--Continued

		14.	15.	16.	17.	18.	19.	20.	21.	Mean	SD
PA Admin 1	1.	14	20	24	22	25	08	28	-10	8.21	2.40
PA Admin 2	2.	01	00	-04	-14	-16	06	01	24	9.28	3.02
BD Admin 1	3.	34	19	22	11	33	25	09	-26	9.09	2.36
BD Admin 2	4.	19	41	36	10	16	14	02	-03	10.38	2.96
Total Adin. 1	5.	30	24	28	21	36	20	23	-23	17.30	3.75
Total Adin. 2	6.	13	25	19	-03	-01	13	02	14	19.66	4.73
Total Scre	7.	23	28	27	08	18	18	13	-03	36.96	7.37
Total BD	8.	28	34	32	11	26	21	06	-15	19.47	4.77
Total PA	9.	09	12	11	02	02	09	16	12	17.49	4.12
SCAT (V)	10.	41	52	54	58	29	57	51	-59	259.74	5.94
SCAT (Q)	11.	61	74	62	66	34	59	50	-34	268.09	6.22
SCAT (T)	12.	73	82	79	84	54	79	72	-69	265.85	4.05
G.P.A. 666	13.	39	79	82	72	34	44	33	-06	2.41	.54
G.P.A. 167	14.	-	36	45	40	78	79	64	-27	2.44	.53
English /66	15.		-	70	54	41	33	24	-24	2.38	.60
Soc. St.6/66	16.			-	71	43	46	34	-09	2.38	.64
Math. 6/6	17.				-	39	47	47	-22	2.28	.77
English /67	18.					-	64	41	-22	2.38	.77
Soc. St.1/67	19.						-	48	-21	2.08	.85
Math. 1/6	20.							-	-31	2.36	.80
Age	21.								-	159.00	8.01

Not.--For a one-tailed test with N = 53, significance is indicted at the .05 level when r = .23 and at the .01 level whn r = .32.

Studies 6/66, and Mathematics 1/67. The total second administration is significantly related to GPA 6/66 and English 6/66. The total score is significantly related to both GPAs, English 6/66, and Social Studies 6/66. The total BD is significantly related to GPAs 6/66 and 1/67, both English grades, and Social Studies 6/66.

The correlation between the V and Q SCAT scales is positive and significant. This finding is in contrast to the significant negative relationship reported in Table 39 between the SCAT V and Q in the experimental group. The correlations between the SCAT scales and GPAs, and between the former and core subject area grades are all highly significant and range from .29 to .85.

The correlations between the GPAs and core subject area grades are all highly significant.

Age is significantly negatively related to many of the variables including BD first administration, total first administration, SCAT V, SCAT Q, SCAT total, GPA 1/67, English 6/66, and Mathematics 1/67. Age is significantly positively related to PA second administration.

Table 41 presents the correlations between elective subject area grades and the variables common to all subjects. An elective area was included if there were a minimum of ten subjects in the course. Both experimental and control subjects were combined for these correlations as in Table 38; thus the nine scores involving the two subtests are not "pure" measures.

PA first administration and PA total do not significantly correlate with any of the grades obtained in the elective subject areas. PA second administration correlates significantly with Shop 1/67. BD first administration correlates significantly with Reading 6/66 and Arts and Crafts 1/67. BD second administration is significantly correlated with both Reading grades, both Arts and Crafts grades, and Shop 1/67. The total first administration is significantly correlated with Arts and Crafts 1/67. The total second administration is significantly correlated with Reading 6/66, the two Arts and Crafts grades, and Shop 1/67. The total score is significantly correlated with Reading 6/66 and both Arts and Crafts grades. The total BD score is significantly correlated with Reading 6/66, both Arts and Crafts grades, and Shop 1/67.

Table 41

Corrlations of Other Subject Areas With Variables Common to All Groups in Experiment 2

	PA Admin. 1	PA Admin. 2	BD Admin. 1	BD Admin. 2	Total Admin. 1	Total Admin. 2	Total Score	Total BD	Total PA	SCAT (V)	SCAT (Q)	SCAT (T)
Science /66	-17	21	04	15	-09	24	11	11	06	43	63	85
Spanish /66	-09	-12	00	02	-07	-07	-09	01	-15	22	01	26
Reading /66	-06	15	20	26	10	27	22	26	07	69	44	80
A. & C. /66	-01	15	09	25	05	26	20	20	10	34	40	57
Hdwg. 6/6	-04	-03	06	13	01	07	05	11	-04	47	38	67
Spelling 6/66	-07	-04	05	07	-01	02	00	07	-07	69	33	76
Music 6/6	07	01	05	17	08	11	11	12	04	45	36	64
Spanish /67	-16	10	08	12	-05	14	06	11	-04	09	36	48
Reading /67	01	01	-01	-26	00	-15	-11	-17	02	19	17	25
A. & C. /67	15	05	30	49	32	34	40	44	14	45	21	45
Music 1/7	09	-20	-09	-06	00	-16	-11	-09	-09	56	32	73
Shop 1/	-03	47	28	48	11	57	40	43	27	-27	69	71
Hmkng. 67	-20	18	03	-12	-10	00	-06	-07	00	11	-43	-39

(Table 41 continued next page)

Table 41--Continued

	G.P.A. 6/66	G.P.A. 1/67	English 6/66	Soc. St. 6/66	Math. 6/66	English 1/67	Soc. St. 1/67	Math. 1/67	Age	Mean	SD	N	r required for significance	
													.05	.01
Science 6/66	60	55	40	47	50	51	54	45	-27	2.53	.75	46	25	34
Spanish 6/66	65	42	51	25	31	34	23	27	-09	2.90	.83	42	26	36
Reading 6/66	69	34	47	50	29	24	39	27	02	2.47	.74	110	16	22
A. & C. 6/66	68	13	43	44	25	18	11	16	15	2.49	.78	98	17	23
Hdwg. 6/66	83	48	56	52	46	44	45	40	04	2.38	.71	97	17	24
Spellin 66	81	42	58	46	42	44	37	40	-02	2.64	.87	98	17	23
Music 6/66	76	28	56	49	44	29	26	23	-02	2.34	.65	96	17	24
Spanish 66	30	64	41	27	05	42	27	23	12	2.44	1.01	75	19	27
Reading 1/67	-15	49	-06	-10	-07	26	30	13	-11	2.75	.77	57	22	31
A. & C. 1/67	23	43	37	26	22	16	14	31	-10	2.56	.80	32	30	41
Music 1/67	17	58	07	15	19	30	56	31	15	2.50	.82	26	33	45
Shop 1/67	65	72	34	62	36	55	47	71	04	1.93	.73	14	43	57
Hmkng. 7 /67	41	58	50	45	22	59	00	42	-46	2.81	.77	16	40	54

The SCAT scales are highly correlated with many elective subject area grades. The SCAT V significantly correlates with Science 6/66, Reading 6/66, both Arts and Crafts grades, Handwriting 6/66, Spelling 6/66, and both Music grades. The SCAT Q is significantly correlated with Science 6/66, Reading 6/66, Arts and Crafts 6/66, Handwriting 6/66, Spelling 6/66, Music 6/66, Spanish 6/66, and Shop 1/67. There is a significant negative correlation between SCAT Q and Homemaking 1/67. The SCAT total score significantly correlates with all elective subject area grades except Homemaking 1/67.

The relationship between the GPA and elective subject area grades, and between the core subject area grades and elective subject area grades is generally strong. A number of nonsignificant correlations, however, are also noted. Three elective subject area grades do not correlate significantly with GPA 6/66, and all are from the 1/67 grading period: Reading 1/67, Arts and Crafts 1/67, and Music 1/67. In contrast, with the exception of the nonsignificant Arts and Crafts 6/66 correlation, all elective subject area grades correlate significantly with GPA 1/67. Three elective grades do not correlate significantly with English 6/66: Reading 1/67, Music 1/67, and Shop 1/67. Four elective areas do not significantly correlate with Social Studies 6/66: Spanish 6/66, Reading 1/67, Arts and Crafts 1/67, and Music 1/67. There are seven elective subject areas that correlate significantly with Mathematics 6/66: Science 6/66, Spanish 6/66, Reading 6/66, Arts and Crafts 6/66, Handwriting 6/66, Spelling 6/66, and Music 6/66. The six elective areas not correlating significantly with Mathematics 6/66 are from subject areas graded in the 1/67 semester. English 1/67 correlates significantly with 11 elective subject areas and not [illegible] two subject area grades: Arts and Crafts 1/67 and Music 1/67. Social Studies 1/67 does not significantly correlate with the following four elective subject area grades: Spanish 6/66, Arts and Crafts 6/66, Arts and Crafts 1/67, and Homemaking 1/67. Mathematics 1/67 does not significantly correlate with Arts and Crafts 6/66, Reading 1/67, and Music 1/67.

The elective subject areas significantly correlating with all of the core subject area grades and with the two GPAs are Science 6/66, Reading 6/66, Handwriting 6/66, Spelling 6/66, and Music 6/66. In contrast, many of the elective subject areas graded in 1/67 are not significantly related to some of the core subject areas or to GPA.

Age is significantly negatively correlated with Science 6/66 and Homemaking 1/67. No other correlations between age and elective subject area grades are significant.

Tables 42 and 43 present the same variables as Table 41--elective subject area grades and variables common to all subjects--but separately for the experimental and control groups. Table 42 shows that in the experimental group only three correlations reach significance among the nine subtest scores and the elective subject area grades. PA second administration and PA total are significantly correlated with Reading 1/67, and PA first administration is significantly correlated with Music 1/67.

The two SCAT scales and the SCAT total score in the experimental group are significantly correlated with many elective subject area grades. The nonsignificant correlations are between the three SCAT scores and Spanish 6/66; between the three SCAT scores and Reading 1/67; between SCAT V and Shop 1/67; between SCAT Q and Spanish 1/67, Arts and Crafts 1/67, and Homemaking 1/67; and between SCAT total score and Homemaking 1/67.

The correlations in the experimental group between the elective subject area grades and GPA, and between the elective subject area grades and core subject area grades are usually positive and significant. Science 6/66, Reading 6/66, Handwriting 6/66, Spelling 6/66, and Music 6/66 are significantly correlated with all of the core subject area grades and with the two GPAs. Three elective subject area grades are significantly correlated with the two GPAs and with three, four, or five of the six core subject area grades. The nonsignificant correlations for these three elective subject area grades are as follows: Spanish 6/66 is not significantly correlated with both Social Studies grades and with English 1/67; Arts and Crafts 6/66 is not significantly correlated with Mathematics 6/66 and Social Studies 1/67; Spanish 1/67 is not significantly related to Mathematics 6/66 and Social Studies 1/67. Reading 1/67 is significantly correlated only with GPA 1/67; Arts and Crafts 1/67 is significantly correlated only with English 6/66; Music 1/67 is significantly correlated with GPA 1/67 and Social Studies 1/67; Shop 1/67 is significantly correlated with both English grades; and Homemaking 1/67 is not significantly correlated with any of the core subject area grades or with the two GPAs.

Table 42

Correlations of Other Subject Areas With Variables Common to All Experimental Subjects in Experiment 2

	PA Admin. 1	PA Admin. 2	BD Admin. 1	BD Admin. 2	Total Admin. 1	Total Admin. 2	Total Score	Total BD	Total PA	SCAT (V)	SCAT (Q)	SCAT (T)
Science 6/66	-14	21	-07	-06	-14	14	01	-08	08	56	38	77
Spanish 6/66	-14	-18	-11	-23	-18	-27	-29	-19	-22	14	-18	-11
Reading 6/66	-07	18	15	11	07	19	16	15	09	70	47	84
A. & C. 6/66	-05	15	12	16	06	21	16	15	08	40	38	64
Hdwg. 6/66	-09	-02	01	-08	-05	-07	-08	-04	-07	45	36	63
Spelling 6/66	-10	05	02	-10	-05	-03	-05	-05	-02	66	34	74
Music 6/66	04	10	02	00	04	07	06	00	10	48	31	63
Spanish 1/67	-14	07	04	03	-06	06	00	04	-04	53	23	64
Reading 1/67	26	30	-07	-27	11	02	07	20	34	-14	14	-02
A. & C. 1/67	30	-05	16	34	28	21	33	28	16	49	24	55
Music 1/67	49	13	-09	00	18	04	13	-06	40	62	56	84
Shop 1/67	-25	38	00	61	-26	69	43	40	00	-32	91	82
Hmkng. 1/67	21	06	-06	13	00	12	05	00	13	87	-38	58

(Table 42 continued next page)

Table 42--Continued

	G.P.A. 6/66	G.P.A. 1/67	English 6/66	Soc. St. 6/66	Math. 6/66	English 1/67	Soc. St. 1/67	Math. 1/67	Age	Mean	SD	N	r required for significance	
													.05	.01
Science 6/66	51	50	33	44	44	56	47	37	-32	2.50	.64	28	32	44
Spanish 6/66	58	49	45	10	30	28	21	40	-17	2.89	.84	28	32	44
Reading 6/66	68	38	45	49	21	27	40	36	-10	2.44	.77	62	21	30
A, & C. 6/66	70	31	40	44	21	37	21	37	-03	2.48	.79	56	22	31
Hdwg. 6/66	80	55	51	39	38	44	44	47	-11	2.32	.67	56	22	31
Spelling 6/66	84	51	51	39	36	51	41	52	13	2.56	.94	55	22	31
Music 6/66	72	35	50	38	40	30	26	26	-09	2.34	.65	56	22	31
Spanish 1/67	38	63	43	26	12	39	18	37	15	2.26	1.05	42	26	36
Reading 1/67	-16	49	-05	-18	-13	27	29	22	-14	2.66	.76	32	30	41
A, & C. 1/67	17	35	63	40	29	09	24	21	-04	2.47	.76	15	44	59
Music 1/67	17	52	00	24	24	16	52	20	31	2.33	.93	15	44	59
Shop 1/67	65	63	100	71	58	80	29	71	-18	1.60	.71	05	80	93
Hmkng. 1/67	76	64	71	75	50	75	25	75	-46	2.43	.82	07	67	83

Table 43

Correlations of Other Subject Areas With Variables Common to All Control Subjects in Experiment 2

	PA Admin. 1	PA Admin. 2	BD Admin. 1	BD Admin. 2	Total Admin. 1	Total Admin. 2	Total Score	Total BD	Total PA	SCAT (V)	SCAT (Q)	SCAT (T)
Science 6/66	-18	25	16	32	00	38	26	28	06	34	76	90
Spanish 6/66	04	03	24	55	21	39	40	43	05	34	56	69
Reading 6/66	-01	15	28	49	18	41	36	45	10	65	37	74
A. & C. 6/66	05	15	07	37	06	33	25	27	14	29	42	48
Hdwg. 6/66	07	02	13	42	13	28	24	33	06	46	43	69
Spelling 6/66	01	-10	13	37	08	18	15	30	-07	72	33	76
Music 6/66	11	-08	10	39	12	18	18	29	-01	40	48	65
Spanish 1/67	-06	19	20	26	09	30	24	26	10	-35	55	17
Reading 1/67	-22	-21	12	-18	-09	-25	-20	-07	-28	57	30	52
A. & C. 1/67	16	16	43	59	49	44	51	57	22	36	21	36
Music 1/67	-30	-44	-16	00	-28	-34	-43	-11	-51	-61	-33	-68
Shop 1/67	30	51	48	48	38	57	53	47	48	-09	88	60
Hmkng. 1/67	-20	25	21	-05	06	08	06	07	00	-78	-42	-84

(Table 43 continued next page)

Table 43--Continued

	G.P.A. 6/66	G.P.A. 1/67	English 6/66	Soc. St. 6/66	Math. 6/66	English 1/67	Soc. St. 1/67	Math. 1/67	Age	Mean	SD	N	r required for significance	
													.05	.01
Science 6/66	70	59	63	55	64	45	58	53	-25	2.61	.94	18	40	54
Spanish 6/66	79	31	68	68	42	45	36	00	08	2.93	.83	14	46	61
Reading 6/66	71	27	56	56	39	20	42	16	22	2.52	.71	48	24	34
A. & C. 6/66	66	-16	46	44	30	-12	-03	-16	40	2.50	.78	42	26	36
Hdwg. 6/66	84	38	62	69	61	42	46	31	31	2.46	.79	41	26	36
Spelling 6/66	78	22	72	57	52	29	32	17	25	2.74	.77	43	25	35
Music 6/66	80	20	63	63	53	29	28	20	09	2.35	.68	40	26	37
Spanish 1/67	13	58	34	24	-08	42	35	-04	06	2.67	.94	33	29	40
Reading 1/67	-13	46	-08	00	00	16	36	-07	-06	2.88	.79	25	34	46
A. & C. 1/67	25	46	29	24	18	23	15	35	-20	2.65	.87	17	41	56
Music 1/67	-10	56	00	00	00	55	51	40	-02	2.73	.71	11	52	68
Shop 1/67	53	65	00	63	22	40	57	63	05	2.11	.79	09	58	75
Hmkng. 1/67	35	48	41	41	29	29	00	44	14	3.11	.61	09	58	75

Because of the small number of subjects, fifteen or below, in the elective subject areas of Arts and Crafts 1/67, Music 1/67, Shop 1/67, and Homemaking 1/67, the correlations must be very high to reach significance. The elective subject area grades obtained in 1/67 usually do not significantly correlate with the core subject area grades or with GPA, while most of the 6/66 elective subject area grades are significantly related to the core subject area grades and to the GPAs.

Age in the experimental group is not significantly positively related to any of the elective subject areas, but age is significantly negatively related to Science 6/66.

Table 43 presents the correlations between the elective subject areas and the variables common to all subjects for the control group. Table 43 shows, in contrast to the data of Table 42, that a considerable number of significant correlations exist between the nine subtest scores and elective subject area grades. BD first administration is significantly related to Reading 6/66 and Arts and Crafts 1/67; BD second administration is significantly related to Spanish 6/66, Reading 6/66, Arts and Crafts 6/66, Handwriting 6/66, Spelling 6/66, Music 6/66, and Arts and Crafts 1/67. The total first administration is significantly related to Arts and Crafts 1/67. The total second administration is significantly correlated with Reading 6/66, Arts and Crafts 6/66, Handwriting 6/66, and Arts and Crafts 1/67. The total score is significantly related to Reading 6/66, and Arts and Crafts 1/67. The total BD is significantly correlated with Reading 6/66, Arts and Crafts 6/66, Handwriting 6/66, Spelling 6/66, Music 6/66, and Arts and Crafts 1/67. The three PA scores are not significantly correlated with any elective subject area grades.

The correlations between the three SCAT scores and elective subject area grades in the control group are generally highly significant. The SCAT V scale significantly correlates in both a positive and negative direction with 9 of the 13 elective subject area grades. The nonsignificant correlations are with Science 6/66, Spanish 6/66, Arts and Crafts 1/67, and Shop 1/67; the three significant negative correlations are with Spanish 1/67, Music 1/67, and Homemaking 1/67; and the six significant positive correlations are with Reading 6/66, Arts and Crafts 6/66, Handwriting 6/66, Spelling 6/66, Music 6/66, and Reading 1/67. The SCAT Q scale significantly correlates in a positive direction with 9 of the 13 elective area grades; the nonsignificant correlations are with Reading 1/67, Arts and Crafts 1/67, Music 1/67, and Homemaking 1/67. The SCAT total score significantly correlates in both a positive and negative direction with 11 of the 13 elective area grades. The nonsignificant correlations are with Spanish 1/67 and Arts and Crafts 1/67; the one significant negative correlation is with Homemaking 1/67.

The correlations between the elective subject area grades and the core subject area grades, and between the former and GPA are usually highly significant. Science 6/66 and Handwriting 6/66 are significantly related to all of the core subject area grades and to both GPAs. Spanish 6/66 is significantly related to GPA 6/66, English 6/66, and Social Studies 6/66. Reading 6/66 is significantly related to the two GPAs and to all of the core subject area grades, with the exception of English 1/67 and Mathematics 1/67. Arts and Crafts 6/66 is significantly related to GPA 6/66, English 6/66, Social Studies 6/66, and Mathematics 6/66. Spelling 6/66 and Music 6/66 are not significantly related to GPA 1/67 and Mathematics 1/67, but they are significantly related to the other core subject areas and to GPA 6/66. Spanish 1/67 is significantly related to GPA 1/67, English 6/66, English 1/67, and Social Studies 1/67. Reading 1/67 is significantly related to GPA 1/67 and Social Studies 1/67. Arts and Crafts 1/67 is significantly related to GPA 1/67. Music 1/67 is significantly related to GPA 1/67 and English 1/67. Shop 1/67 is significantly related to GPA 1/67, Social Studies 6/66, and Mathematics 1/67. Homemaking 1/67 is not significantly related to any of the core subject area grades or to the two GPAs. As in the total and experimental groups, the elective subject area grades in the control group obtained in 1/67 usually are not significantly related to the core subject area grades or to the GPAs, while most of the 6/66 elective subject area grades are significantly related to the core subject area grades and to the GPAs.

Age in the control group is significantly related to Arts and Crafts 6/66, Handwriting 6/66, and Spelling 6/66. No other correlations with age reach significance.

6. Discussion

Performance on either the initial or subsequent administration of the BD was not affected in Experiment 1 when subjects were given help by constructing part of the design (first or last rows or columns) on a mean number of 1.85 designs. However, when more extensive help was given in Experiment 2 by providing help on a mean number of 2.00 designs and providing a mean number of 3.11 help steps (i.e., giving more time, constructing first column, and constructing first and part or all of the second and/or third columns) the subjects scored higher on the first and second administrations of the BD than those subjects not receiving help on the first administration. In Experiment 2, PA performance was also significantly improved on both the first and second administrations when a series of help steps was administered. These results have implications for the examination procedure and for teaching methods.

The subject's BD performance was not significantly affected when the examiner slightly modified the standard procedures by showing the subject how to complete part of the design after he had failed the design. However, when more extensive help was introduced the subject's performance was significantly improved. Thus the results indicate that alterations in standard procedures, when minor, are not likely to affect BD performance; however, when extensive, BD performance is affected. The examiner should therefore not introduce extensive testing-the-limit procedures during the examination; rather, he should wait until the examination has been completed before such procedures are attempted.

Wechsler (1958) suggested that stories may be obtained from the Wechsler Adult Intelligence Scale PA items immediately after each item is completed. This procedure introduces an additional variable which may affect the subject's performance. By telling a story after he has completed his arrangement, the subject has time to evaluate further his arrangement. He may see that his arrangement was incorrect, and possibly obtain insight which may be useful in solving the next arrangements. The results of the present study do not provide an answer to whether test scores are altered when stories are asked. However, obtaining stories is a modification in test procedure; a modification which needs to be investigated for its possible effects on test performance.

Because the present data were collected from average ability students whose academic performance was also average, it is difficult to generalize the findings to other ability groups or to groups with learning difficulties. These latter groups should be studied in future research concerned with the effects of cues on test performance. Similarly, because only two Wechsler subtests were studied, the data do not permit generalization to other subtests; other subtests also need to be studied in relation to their susceptibility to cues.

Training methods designed to enhance spatial-visual reasoning required for successful performance on the BD and on other spatial relations tasks have been shown to be successful with various groups. Schubert (1967) found that children between the ages of 7 and 8, and 10 and 11 receiving training achieved significantly higher WISC BD scores than the control group on a repeated administration of the test three to five days after the initial testing and training session. The control group as a result of practice also achieved significantly higher scores on the repeated administration. He also found that the gain scores were significantly negatively related to the block design ability of children coming from an unfavorable home background, while in the favorable background group the gain scores were not significantly correlated with block design ability. His results are in agreement with the findings of the present investigation.

There is some evidence, too, that the spatial relations performance of severely retarded adults can be raised by intensive training (Tizard & Loos, 1954). Holloway (1954), however, found that the retest WISC scores of kindergarten children receiving training were not significantly different than the control group's retest scores. The training procedures employed by Holloway were not specific to Block Design subtest performance but were general exercises.

Minimal training procedures, i.e., employing one help step, were not effective in enhancing block design performance, while more extensive cues were effective in improving performance. The results demonstrate that training methods can be employed to raise the intellectual performance of average ability adolescents on the BD and PA subtests of the Wechsler examinations. It would be important to determine whether children of more limited ability, and whether children of younger ages could also benefit from the training procedures used in the present investigation.

Because the PA subtest was not administered in Experiment 1, it cannot be determined whether PA performance is altered as a result of one specific help step. It is important, therefore, also to study the relationship between number or type of help steps and intellectual performance using many different tests.

Improved performance on a retest without intervening training procedures has been found in numerous studies. For example, Hamister (1949), Steisel (1951), and Barry, Fulkerson, Kubala, and Seaquist (1956) using the WB (I and/or II), and Holloway (1954) and Schubert (1967) using the WISC reported significantly higher retest scores. In both Experiments 1 and 2, too, significantly higher retest scores were achieved by the control group. The most effective procedure for raising intelligence test scores, according to a number of investigators (cf., Casey, Harter, & Davidson, 1928; Dempster, 1954; Greene, 1928; Vernon, 1954), is a combination of practice and coaching. The results of the present study are in agreement with these writers. In Experiment 2 practice (i.e., taking the test) in combination with coaching (i.e., receiving cues) resulted in significantly increased retest scores when compared to the retest scores achieved by subjects having practice only.

The four cues used in Experiment 1 did not differentially affect performance. The cues were designed using rows or columns, and no attempt was made to design cues with respect to the Gestalt properties of the individual designs. Comparing cues designed with respect to the Gestalt properties of the designs with other types of cues is another area needing study.

In Experiment 1 the three examiners performed in a similar manner with respect to (a) the BD scores they obtained on the first and second administrations and on the five cue conditions, and (b) the number of help items they administered. In Experiment 2 there were no differences among the four examiners (a) in the scores they obtained in the experimental and control conditions on the two administrations of both BD and PA subtests, and (b) in the number of help steps they administered. However, the examiners differed in the number of help items they administered; differences due in part to the order in which the two subtests and two test forms were administered. Because there is a very high correlation between the number of help steps and number of help items administered, and because there was no significant difference among the examiners in the number of help steps they administered, it is difficult to interpret the significant differences which resulted among the examiners in the number of help items they administered.

Only one of the many analyses of the scores obtained by the examiners was significant. The significant finding was with respect to the number of help items the examiners administered in Experiment 2, but not with respect to any of the test scores they obtained. Even though the subjects tested by Examiner 1 had significantly lower SCAT scores than the subjects tested by Examiner 2 and 3 in Experiment 1, the BD results were not affected. The results indicate that examiners with minimal training in the administration of standardized intelligence tests do not differ in the scores they obtain. The present results agree with other studies which reported no examiner differences (e.g., Nichols, 1959; Murdy, 1962), but they disagree with the studies which reported examiner differences (e.g., Cattell, 1937; Cieutat, 1965; Cohen, 1965; Smith & May, 1967a, 1967b; Smith, May, & Lebovitz, 1966). The factors which lead to differences among examiners in the scores they obtain are not well understood. The present results suggest that the examiner variable does not necessarily affect the reliability of the intelligence test score.

The one female examiner in Experiments 1 and 2 obtained scores similar to those of the male examiners; therefore, the sex of the examiner was not a significant variable. These results differ from Cieutat's (1965) finding that the sex of the examiner affects the obtained intelligence test scores. Glasser and Zimmerman (1967), using Cieutat's (1965) finding, state that "For younger children, the sex of the examiner may prove crucial [p. 108]." Yet, as indicated in the review of literature section, there is little empirical evidence supporting their observation.

In both Experiments 1 and 2 equivalent WISC and WB means were found. Other studies have also analyzed the relationship between the WB and WISC, and the results are not conclusive. Vanderhorst, Sloan, and Bensberg (1953) found that mental defectives in the chronological age range of 11 to 16 years had similar BD and PA means on the WISC and WB. Knopf, Murfett, and Milstein (1954) studying average ability adolescents, and Delattre and Cole (1952) studying children between 10-5 and 15-7 reported that the BD was significantly correlated for the two test forms, whereas the PA correlations were not significantly different from zero. Price and Thorne (1955) found that at the 11½ and 14½ year levels the two forms did not have equivalent IQs; however, data was not provided on the individual subtests. Littell (1960) in his WISC review concluded that the two forms appear related to a significant degree, but the WB Verbal Scale scores are lower than the WISC Verbal Scale scores. The results of the present study suggest that with an average ability group of adolescents the scores obtained on the BD and PA subtests are not significantly different as a function of the WB or WISC test form.

Subtest order is a variable which can affect test performance. Exner (1966), Guertin (1954), and Klugman (1948) reported significant effects due to the order of subtest administration, while Frandsen et al. (1950) did not find significant effects. In Experiment 2 some results indicated that the order of administering the subtests significantly affected performance: The combined subtest-test form order of administration was related to the number of help items administered by the examiners. When compared with two examiners, one examiner gave more help when the BD (WB) began the order, and another examiner gave less help when the PA (WISC) began the order. These results indicate that the order of administering the two subtests did not affect test scores; the subtest order in combination with test form, however, was a significant variable in affecting the number of help items administered by the examiners.

The order in which test forms are administered has also been at times shown to affect performance. Hays and Schneider (1951) and Gerboth (1950), for example, found that the order of administering Forms I and II of the WB affects test scores, while Barry, Fulkerson, Kubala, and Seaquist (1956) did not find significant differences in scores as a function of the test form order of administration. Grisso and Meadow (1967) reported that college students obtained significantly lower WAIS scores when the Rorschach preceded the WAIS than when either the Bender-Gestalt or when no test preceded the WAIS. In Experiment 1, the order of administering the test forms was not a significant variable. Similar BD scores were obtained when either the WISC BD or WB BD was administered first. In Experiment 2, however, the results indicated that the order of administering the test forms was a significant variable. In the control group, higher scores were associated with the BD subtest than with the PA subtest when the WB form began the order (i.e., when either the WB BD or PA was administered first). The WB possibly provided more effective cues which enabled the subjects to perform at a higher level. In the experimental group, however, higher BD than PA scores were obtained on the order in which the WISC BD was administered first as well as when the WB began the order.

The results of the present study as well as the results of other studies indicate that examiners must carefully evaluate the effects of any departures from the standard order of administering the subtests of the WISC or WB. Second, the order of administering the test forms must be considered, especially in test-retest studies. Third, the order in which an intelligence test is administered in a series of tests can be a contributing factor in lowering the reliability of the intelligence test score. Perhaps in the future more attention will be devoted to standardizing the order in which psychological tests are administered. Much remains to be learned about how and why different administrative orders affect test performance.

The subject-sex factor was not significant in any of the analyses. Adolescent males and females selected initially by their having average SCAT total scores and no learning disabilities achieved equivalent BD subtest scores, achieved equivalent PA subtest scores, improved equally as a result of practice, and had similar SCAT V and Q scores.

In Experiment 2 the BD scores were significantly higher than the PA scores on both administrations; however, there are no apparent reasons accounting for these findings. The results indicate that the subjects had more difficulty in the anticipation and planning tasks (PA) than in the visual-motor spatial reasoning tasks (BD). For the total group, the BD mean was .64 points higher than the PA mean.

All correlations, with the exception of the SCAT scores, are based upon a restricted range of talent because the subjects in the study were selected from an average ability group. It is therefore likely that the correlations represent lower estimates than would be found in a more heterogenous group.

Many of the correlations in Experiments 1 and 2 were computed using the same variables. However, the correlations are not always in agreement in the two experiments. For the nonsubtest variables, the only difference in the two experiments was the subject population. The same criteria were used in both experiments in selecting the subjects; these in part included a SCAT total score within .60 of a standard deviation from the mean of their class and no participation in any special education program. In Experiment 1 the subjects were all from the same junior high school (Mar Vista) attending the eighth and ninth grades, while in

Experiment 2 the subjects were from two junior high schools (Mar Vista and National City), and a majority (86%) were in the 7th grade. The differences between the subjects in Experiment 1 and 2 in schools and in class may have affected the correlations.

There is generally good agreement in Experiments 1 and 2 in the correlations between the SCAT scale scores and grades, and between the former and GPAs. In both experiments there are many significant correlations between the three SCAT scores and grades, and between SCAT scores and GPAs. However, a number of inconsistencies also appear. In Experiment 1 there was a significant negative correlation between English 1/67 grades and the SCAT Q score; in contrast, in Experiment 2 both English grades (6/66 and 1/67) are significantly positively correlated with the SCAT Q for the total group. These contradictory findings are difficult to interpret since the only differences between the subjects in the two experiments were in their ages and in the schools they were attending. Because the other correlations between the SCAT scores and grades, and between the SCAT scores and GPAs are in agreement in the two experiments, the conflicting English and SCAT Q correlations appear to have occurred on the basis of chance.

For the total group in Experiments 1 and 2, the SCAT V and the SCAT Q are not significantly correlated. However, in Experiment 2 a significant negative correlation between the SCAT V and Q resulted in the experimental group, while in the control group a significant positive correlation appeared. Because the subjects were randomly assigned to the treatment conditions, these findings are puzzling. The present findings differ from the .71 correlation between the SCAT V and Q for grade 7 reported in the SCAT Technical Report (1957). Even though a restricted range of talent was used in the present experiments, all correlations employing the SCAT scores were corrected for the curtailed range. Thus, it appears, that with average ability subjects in a relatively homogenous group, the SCAT V and Q scales do not have a significant amount of variance in common.

The three BD scores in Experiment 1 are generally not related to grades. The BD first administration scores are not related to grades obtained in the core subject areas, but they are related to two elective subject area grades, Homemaking 6/66 and Shop 1/67. The second administration BD scores are positively related to Mathematics grades and Homemaking 6/66, and are significantly negatively related to English 1/67 grades. The total BD is also significantly negatively related to English 1/67 grades and positively related to Mathematics 6/66, Homemaking 6/66, and Shop 1/67 grades.

The control group of Experiment 2 is similar in some respects to the total group of Experiment 1. In Experiment 1 the total group represents the pooled group, and the pooled group can be thought of as a control group because the experimental treatments were not significant. The correlations obtained between BD performances and grades in the control group of Experiment 2 do not parallel the findings of Experiment 1. Thus, for example, in the control group of Experiment 2 English 1/67 is significantly positively correlated with BD second administration and with BD total administration; in Experiment 1, however, English 1/67 is significantly negatively related to these two BD scores. Mathematics and Homemaking grades were not found to be significantly related to any of the BD scores in the total experimental and control groups of Experiment 2, but the correlations between these subject area grades and BD scores were significant in Experiment 1.

There is one similar result for the total groups in both experiments: a significant positive correlation between Shop 1/67 and the total BD score. Shop 1/67 is also significantly correlated with BD second administration in the total group of Experiment 2. However, when Shop 1/67 grades were correlated with the BD scores of Experiment 2 for the control and experimental groups separately, the correlations, while in the same direction as in the total group, failed to reach significance. The small number of subjects in the control and experimental groups of Experiment 2 used for the correlations between Shop 1/67 and subtest scores may have been an extenuating factor. Because both experiments found Shop 1/67 significantly related to BD scores, it is likely that the visual-motor abilities required for successful performance in shop activities are related to the visual-motor reasoning abilities measured by the BD.

The correlations between the three BD scores in Experiment 1 and the two GPAs were not significant. In contrast, in the control group of Experiment 2, four of the six correlations between BD and GPA were significant. The conflicting findings in Experiment 1 and 2 with regard to the correlations between BD and grades, and between BD and GPA are difficult to interpret. The differences in the methods employed in Experiments 1 and 2 may have contributed to the noncorroborating findings. Thus, for example, the subjects in Experiment 2 were administered the BD and PA, while the subjects in Experiment 1 only received the BD. In Experiment 1 treatment and control groups were pooled for the correlations; in Experiment 2 the control group did not receive any help. While a significant relationship between BD and GPA in Experiment 1 did not exist, there were four highly significant correlations in the control group of Experiment 2 between the three BD scores and the two GPAs. Thus, for seventh and eighth grade subjects of average ability the BD administered under standard conditions can be considered to have some validity in predicting the GPA. Similarly, while the significant findings of Experiment 1 with regard to the relationship between BD and school grades were not replicated in Experiment 2, there are a number of significant correlations in Experiment 2 which indicate that BD scores can be considered to have some validity in predicting individual subject area grades.

The correlations between the nine subtest scores of Experiment 2 and GPAs, and between the former and core subject area grades resulted in many significant relationships. The correlations for the total group (combined experimental and control) indicate that the first administration PA scores are not significantly related to any of the grades or to GPAs, while the second administration PA and the total PA scores correlate significantly with only Social Studies 1/67. The three BD scores, in contrast, are generally significantly correlated with GPA, English, and Social Studies; the BD first administration, in addition, is significantly correlated with Mathematics. The total first administration score correlates with English, Social Studies, and Mathematics, while the total second administration score correlates with GPA and Social Studies. The total score is correlated with GPA, English, and Social Studies. Thus for the total group in Experiment 2, individual BD subtest scores and combined BD and/or PA scores correlate with GPA and with individual core subject area grades; PA scores, however, are not good predictors of grades in the total group.

The correlations between subtest scores and grades, and between the former and GPA in the control and experimental groups of Experiment 2 differ in many respects. In the control group many more significant correlations occur. Thus, for example, 26 significant correlations appear between the nine subtest scores and the core subject area grades and between the former and GPA, while, in contrast, only 14 significant correlations occur in the experimental group for these same variables. Similarly, for the elective subject areas, 22 significant correlations appear in the control group between the nine subtest scores and elective subject area grades, while in the experimental group only three significant correlations appear. In the control group PA second administration and PA total scores are the only two of the nine subtest scores not significantly correlated with core subject area grades, while PA first, second, and total administration are the only subtest scores not significantly correlated with any of the elective subject area grades. The control group's BD scores are not significantly correlated with Mathematics, while these same variables are significantly correlated in the experimental group.

The results suggest that the administration of help, while significantly raising the subjects scores, simultaneously lowers the subtests scores' power to predict subject area grades or GPA. Thus the best predictor of grades and GPA is the score obtained by following the standard administrative procedures. The BD scores are generally better predictors of grades and GPA than are the PA scores.

The correlations among the nine subtest scores in Experiment 2 show different degrees of relationship in the control, experimental, and total group. In the total group all correlations among the nine subtest scores are significant; in the control group all correlations are significant except for the correlation between PA first administration and PA second administration; and in the experimental group ten nonsignificant correlations occur. The nonsignificant relationship between the two PA scores in the control group indicates that the subjects did not maintain their relative positions on the two administrations. This unexpected finding is difficult to interpret because all other test-retest subtest correlations were significant. Practice therefore altered the retest distribution of PA scores, but not the BD retest score distribution.

The differences among the correlations involving the nine subtest scores in the experimental and control groups indicate that administering help to the experimental group affected the distribution of scores on each administration as well as on each subtest. In the control group the correlation between the PA first and second administration scores was not significant, while in the experimental group the correlation was significant; in the control group PA scores are significantly correlated with BD scores, but these correlations do not reach significance in the experimental group. It appears that as a result of help subjects in the experimental group maintained their same relative position on the first and second administrations of the PA subtest; help, however, simultaneously resulted in changing the PA and BD distributions so that the correlations involving the two subtests were not significant. Administering help not only enabled the experimental group to perform at a higher level of competency than the control group, but it also resulted in a distribution of scores different than the distribution found in the control group on both the PA and BD subtests.

The extent of the relationship between the nine subtest scores in Experiment 2 and the three SCAT scores is dependent upon the condition under which the subtests were administered. The SCAT total score correlated significantly with the nine subtest scores in the total and experimental groups, and with seven of the nine scores in the control group; the exceptions are PA second administration and PA total. In the total group the SCAT V is related to PA first administration, PA total score, total first administration, and total score. In the control group the SCAT V is related to BD second administration, total BD score, total first administration, and PA first administration; however, it is significantly negatively related to PA second administration. In the experimental group SCAT V is not significantly related to BD scores, but it is significantly related to the three PA scores, and to the total first administration, total second administration, and total score.

The pattern of the correlations between SCAT V and subtest scores is complex. In the experimental group the three PA scores were significantly correlated with the SCAT V; in the control group, however, only one significant correlation was found between a PA score and SCAT V. On the other hand, help redistributed the BD scores, too, so that BD scores were not significantly correlated with the SCAT V in the experimental group, while they were in the control group.

The SCAT Q correlates with 8 of the 9 subtest scores in Experiment 2 in the total and control groups; PA first administration is the one subtest not correlating with the SCAT Q in these groups. In the experimental group SCAT Q is significantly related to six of the nine subtest scores; the exceptions are the PA first administration, total first administration, and total PA.

Providing help lowered the number of significant correlations among the subtest scores and SCAT Q. PA first administration is not a good predictor of the SCAT Q.

In contrast to the noncorroborating findings between BD and subject area grades in Experiments 1 and 2, there is much more consistency in the two experiments in the relationship between BD and SCAT scores. In the control group of Experiment 2 all BD scores were significantly related to all SCAT scores, except for the correlation between BD first administration and the SCAT V. In the total group of Experiment 1 all BD scores were significantly related to all SCAT scores, except for the correlation between BD second administration and SCAT Q. In both experiments the highest correlations were obtained between the SCAT total score and BD scores. These very consistent results indicate that BD performance is a good predictor of general intelligence as measured by the SCAT. PA performance, on the other hand, is a poor predictor of SCAT scores in the control group.

The correlations employing help items and help steps showed that the amount of help is significantly negatively related to the subtest score and SCAT score. The help item score is a better predictor of subtest scores than the help step score. There are no significant relationships between help scores (help items and help steps) and grades, and between BD and PA help scores. The results indicate that the help scores are good predictors of subtest and SCAT scores.

Consistent as well as inconsistent trends appear in the correlations employing the age variable in Experiments 1 and 2. The inconsistent results are in the correlations between age and SCAT scales. In Experiment 1 age is significantly positively correlated with the three SCAT scales, while in Experiment 2, for the total group and for the control group, age is significantly negatively related to the SCAT scales. The consistent trends are in the correlations between age and subtest scores, age and GPA, and age and subject area grades. In both experiments age is usually not related to subtest scores. In Experiment 1 and in the control, experimental, and total groups in Experiment 2 age is significantly negatively related to GPA. Age usually is not related to subject area grades. The few significant correlations between age and subject area grades are usually, but not always, in the negative direction. In Experiment 1 age is significantly negatively related to Social Studies 6/66, and positively related to Science 1/67, and Spanish 1/67. In Experiment 2, for the total group, age is never significantly positively related to any subject area grades, but age is significantly negatively related to both English grades, both Mathematics grades, and Social Studies 1/67. In the experimental group of Experiment 2 age is significantly negatively related to Mathematics 6/66 and Science 6/66. In the control group age is significantly positively related to three elective subject areas: Arts and Crafts 6/66, Handwriting 6/66, and Spelling 6/66. The results suggest that the older child obtains a lower GPA, that age is not a good predictor of individual subject area grades, and that the relationship between age and SCAT scores is not clear.

In both Experiments 1 and 2 there are very strong positive relationships between GPAs and subject area grades. This is, of course, expected because GPA is composed of the individual subject area grades. In both experiments and in all groups all core subject area grades are significantly positively related to GPA. In Experiment 1 there are three elective subject area grades that are not significantly correlated with either the GPA obtained in a different semester or with any core subject area grades: Arts and Crafts 6/66, Shop 6/66, and Typing 1/67. In Experiment 2, for the total group, many elective subject area grades obtained in 1/67 are not related to the core subject area grades obtained in 6/66. Elective subject area grades obtained in one semester and core subject area grades obtained in another semester appear to have little variance in common. One possible explanation for this finding is that motivation in elective subject areas may be different than in required core subject areas. The results show that low validity coefficients resulted when midsemester elective subject area grades were predicted from core subject area grades obtained at the completion of the previous semester.

In both experiments many subjects did not need help. In Experiment 1 there were 54 subjects (24%) who completed all of the block designs successfully. In Experiment 2 49 subjects (25%) completed either all of the block designs or all of the picture arrangements successfully. These subjects were not used in the statistical analyses. In designing future experiments both the subject population and tests selected should be carefully considered with respect to the hypotheses tested. In the present experiments both the BD and PA subtests proved to have an inadequate ceiling for many subjects, even though the subjects were of average ability. In future research with these subtests or with other subtests, either more items should be devised to extend the range of difficulty of the subtest, or younger age subjects should be employed. It is obviously impossible to evaluate the effects of help when the subject passes all of the test items.

7. Conclusions and Recommendations

The two experiments were designed to evaluate the effects of help on test performance. Administering help is both a form of violating standard procedures and a form of providing cues for learning. The results of Experiment 1 lead to the conclusion that minor violations in test procedure consisting of administering help on a mean number of 1.85 designs do not significantly alter BD scores, nor does the help prove to be effective in enhancing the learning of spatial-visual tasks.

The results of Experiment 2 lead to the conclusion that more extensive violations than those used in Experiment 1, such as allowing the subject more time followed by more help if the additional time did not result in a successful performance, significantly raise BD and PA scores. The help procedures used in Experiment 2 can also be considered effective learning cues.

The results of the study have implications for testing procedures. Minor departures from standard procedures, such as showing the subject how to construct the first or last row or column of the BD subtest, do not appear to affect performance significantly. However, because the examiner is not likely to know which departures may significantly affect test scores, and because significant improvement in performance appeared as a result of administering a series of cues, it is recommended that testing-the-limit procedures be used after the formal administration is completed. Other tests also need to be studied in order to obtain information about the effects of changes in standard administrative procedures on test performance.

The form of the BD cue was not a significant variable in Experiment 1. First row, last row, first column, and last column BD cues were equally effective. In Experiment 2 subjects receiving a greater number of cues had lower subtest scores and lower SCAT scores. However, there was no significant relationship between the number of BD and PA cues. It is concluded that the BD cues used in the study were not significantly different in affecting BD performance; the number of cues administered, however, is negatively related to intelligence test performance and ability level.

The results showed that practice itself, as has been long known, is an excellent means for improving performance. A series of cues, however, facilitated learning to a greater extent than practice alone. Teaching methods based upon the series of cues used in Experiment 2 will likely be effective in helping children learn to solve spatial-visual and planning and anticipation tasks.

The results of both experiments indicate that the test form is not a significant variable which affects the two subtest scores. Thus, for average ability adolescent students, the WISC and WB BD means and the WISC and WB PA means can be considered equivalent.

The results of Experiment 2, but not of Experiment 1, indicate that the order in which the two test forms, WB and WISC, were administered affected the scores obtained by the subjects on the two subtests. The order of administering the BD and PA subtests was not a significant variable affecting the overall test scores; it was, however, a significant factor in affecting the number of items on which help was administered by the examiners. Thus subtest order and test form order are at times significant variables which affect either test scores or the examiner's help procedures. These results as well as the results reported in the literature indicate that changes in the order of administering the subtests should not be made because such changes can significantly alter the subject's score and/or the examiner's help procedures. Reasons accounting for the significant order effects are not readily available.

Differences among the test scores obtained by the examiners were not found in either of the experiments. It is therefore concluded that the examiner factor did not significantly contribute to the variability of the obtained test scores. The literature review, however, points out that examiners have been found to differ in the test scores they obtain. The examiner factor was significant with respect to the number of help items they administered. Subtle differences likely exist among examiners when they employ procedures designed for testing the limits or for facilitating learning.

It is recommended that in order to diminish examiner bias as a source which contributes to the unreliability of the test score, training procedures be employed to help the examiner become more cognizant of his scoring methods and administrative techniques. The reasons accounting for differences among examiners in their scoring and administrative techniques are not known, and research is needed which will investigate the possible reasons for such divergencies.

A source which contributes to examiner bias is the deficiency in the test manuals in providing adequate scoring guides. It is obvious from the literature review that the scoring of Comprehension test responses, for example, is by no means a mechanical process, and that the scoring of ambiguous responses, in particular, poses numerous problems for the examiner. By providing many more examples of 0, 1, and 2 point responses in the manual as well as by including more precise scoring standards, some of the problems associated with scorer unreliability can be reduced.

The SCAT scales were shown to be excellent predictors of academic grades and GPA. However, the correlations are lower than those reported in the SCAT manual. The data also showed that the SCAT Q and V scales were not significantly correlated. It is concluded that for the homogeneously average ability group of subjects employed in the study the two SCAT scales have little variance in common. In using the SCAT scales with average ability students it is important to be cognizant of the very strong possibility that the two scales are not significantly related.

The predictive validity of the BD and PA subtest scores using grades as the criterion is not high in an average ability group of subjects. The one exception was a consistently significant relationship between Shop grades and BD when the sample consisted of ten or more subjects. BD scores are better predictors of the GPA than PA scores. Generally, the best predictors of grades and GPA are combined subtest scores.

The results clearly indicate that the most significant validity coefficients are found using standard procedures rather than procedures used in the experimental treatments. This finding is especially important for it indicates that by giving a series of cues, not only can the mean score increase, but, also, the distribution of scores changes so that few significant correlations appear between the subtest scores and school grades. The best predictor of school grades, thus, is the score obtained on the intelligence test under standard administrative procedures.

Approximately 25% of those tested were eliminated from the analyses because they passed all of the items on either the BD or PA subtests; thus, the BD and PA subtests of the WISC and WB do not provide adequate ceilings with a population of average ability adolescent students. It is recommended that in future studies, which focus on the effects of modifying standard procedures or on learning procedures, either younger age groups be used or additional items be constructed to expand the range of difficulty of the subtests. Other standardized tests, too, may have limited ceilings, and they should be carefully studied before they are employed in similar investigations.

The SCAT total score is, in most cases, in both experiments and in all groups significantly correlated with the various subtest scores. In contrast, there are a fewer number of significant correlations between the individual SCAT scales and subtest scores. Because all correlations obtained between the BD and SCAT total score were highly significant, it is concluded that the BD is a good predictor of general intelligence as measured by the SCAT total score. On the other hand, because there were two nonsignificant correlations between the PA scores and the SCAT total score in the control group of Experiment 2, it is likely that these measures have little variance in common.

In the control group of Experiment 2 and in the total group of Experiment 1, the SCAT Q scale was significantly correlated with almost all of the subtest scores, while the SCAT V scale had fewer significant correlations. In the experimental group of Experiment 2 there were an equal number (67%) of significant correlations between subtest scores and SCAT Q, and between subtest scores and SCAT V. Providing a series of help steps lowered the number of significant correlations between the subtest scores and the SCAT Q scale, but help also increased the number of significant correlations between subtest scores and the SCAT V scale. The data suggest that the SCAT Q scale is a slightly better predictor of BD and PA performance than the SCAT V scale.

Help scores were shown to be good predictors of subtest scores and SCAT scores, but poor predictors of grades. Thus the more help needed, the lower the ability level.

Age and SCAT scores, and age and subtest scores showed no consistent trends, while, in contrast, age was frequently negatively related to grades and GPA. Thus, older students in the seventh, eighth, and ninth grades of average ability are more likely than younger students to achieve lower grades.

It is concluded that adolescent males and females, selected initially on the basis of average ability and no learning disability, are likely to perform similarly on the BD subtest and PA subtest, to improve equally as a result of practice, and to have similar SCAT V and Q scores.

The results of the experiments are pertinent to average ability adolescents. It is also important to evaluate the effects of modifications in standard procedures for other ability level groups and for emotionally disturbed groups. It is recommended that the cues used in the present study also be administered to other groups, especially lower ability level subjects; the cues, however, appear to be less appropriate for brighter adolescents because of the limited ceiling existing in the BD and PA subtests.

8. Summary

The investigation was designed to determine the effects of alterations in test procedure upon the original and repeated test performance of normal adolescents. The effects of help steps on two subtests, Block Design (BD) and Picture Arrangement (PA), appearing in the Wechsler Intelligence Scale for Children and Wechsler Bellevue Intelligence Scale Form I were investigated.

Two experiments were conducted. In the first 170 eighth and ninth grade students participated, and in the second a different group of 146 seventh and eighth grade students served as subjects. Subjects in both experiments were selected if their School and College Ability Test (SCAT) total score was within .60 of a standard deviation from the mean of their class and if they were not participating in any special education programs.

In the first experiment only the BD subtest was administered. Subjects were randomly assigned to one of two counterbalanced orders, and to one of five groups. Four of the groups, designated as experimental groups, received one of four different block design cues after failing a design, while the fifth group served as the control. In the second experiment the BD and PA subtests were administered. The subjects were randomly assigned to either the control or experimental group and to one of eight counterbalanced test form and subtest orders. In the experimental group a series of cues was administered after the subject failed a design or an arrangement. In both experiments an alternate form of the subtest was administered immediately after the first administration; help was given on the first administration only.

The hypotheses that violation of standard procedures by administering help during the first administration has no effect on test performance during the first or second administration were supported by the results of the first experiment, but not by the results of the second experiment. Minor violations in standard procedure that consisted of showing the subject how to correctly construct the first or last rows or columns of the BD items did not significantly alter test performance in comparison to the control group. On the other hand, a series of cues (more time, arranging some blocks or pictures, or arranging a greater number of blocks or pictures), significantly raised the BD and PA performance on both the first and second administrations when compared to the control group's performance.

The hypothesis that there is no relationship between cues and test performance was supported by the results of the first experiment but not by the results of the second experiment. In the first experiment the type of BD cue--first row, last row, first column, and last column--was equally effective. In the second experiment a greater number of cues was associated with lower subtest and SCAT scores, but not with lower grades. The relationship between the number of BD and PA cues was not significant.

The hypothesis that examiners do not obtain significantly different test scores was supported by the data of both Experiments 1 and 2. Differences among examiners, however, were found in Experiment 2 with respect to the number of items on which they administered help.

Other results indicated that in both experiments the two sexes achieved similar subtest scores in both administrations, improved equally as a result of practice, and had similar SCAT scale scores. The order of administering the two subtests did not affect test scores; subtest order, however, was a significant factor affecting the number of items on which help was administered by the examiners. The order of administering the test forms significantly affected the scores obtained by the subjects on the two subtests. On some orders BD scores were significantly higher than PA scores, while on other orders BD scores were not significantly higher than PA scores. The scores obtained on the two test forms were not significantly different.

Intercorrelations among the variables revealed that the predictive validity of the BD and PA subtests using grades as criteria is not high. However, BD is a good predictor of grade point average (GPA) and SCAT scores, while PA is less effective as a predictor. The scores obtained on the intelligence test when standard administrative procedures (control group) are used are much better predictors of school grades than the scores obtained when help (experimental group) is administered.

SCAT scales were highly correlated with grades and GPA. The SCAT Quantitative scale was found to be a slightly better predictor of BD and PA than the SCAT Verbal scale. The two SCAT scales were not significantly correlated. Age and SCAT scores, and age and subtest scores showed no consistent trends, while, in contrast, age was frequently negatively related to grades and GPA.

Approximately 25% of the subjects correctly solved all of the BD and/or PA items. Thus the subtests had inadequate ceilings for many subjects. In future research which studies test modifications and help procedures it is recommended that either younger subjects be employed or that the range of difficulty of the items be expanded.

The implications of the experimental findings and literature survey pertain to test procedures, teaching methods, and further experimentation. Departures from standard procedures were shown to significantly affect performance in one experiment but not in the other. Because the examiner is not likely to know which departures may significantly affect test scores, it is recommended that testing-the-limit procedures be used after the formal administration is completed. Because the scores obtained when the series of cues was administered were significantly higher than the scores obtained through practice alone, teaching methods based upon the series of cues will likely be effective in helping children learn to solve spatial-visual and planning and anticipation tasks. Further research is needed to evaluate the effects of the help procedures used in the investigation using such groups as lower ability level students, emotionally disturbed children, and children having organic brain damage.

Because the order of administering the test form significantly affected test scores, examiners must carefully evaluate the effects of the order of administering a series of tests. The order of administering the two subtests affected the number of help items administered by the examiners. The latter result plus the results reported in the literature suggest that altering the subtest order can significantly affect test scores and/or the examiner's administration of help. Further work is needed to determine the reasons accounting for the order effects.

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Appendix A.--Recording Form used in Experiment 1 for WISC-WB Order

1 3 5 7 9
I. WISC Raw S._____S.S._____Help Items_____ _____ _____
II. WB Raw S._____S.S._____Help Items_____ _____ _____
2 4 6 8 10

Name:
Age:
Sex:

Date:
Examiner:
Group:

WISC
Block Design

Design	Time	Score	Help Step	
			Time	R or W
A	45"	0 1 2		
B	45"	0 1 2		
C	45"	0 1 2		
1	75"	21-75 16-20 11-15 1-10 0 4 5 6 7		
2	75"	21-75 16-20 11-15 1-10 0 4 5 6 7		
3	75"	26-75 21-25 16-20 1-15 0 4 5 6 7		
4	75"	21-75 16-20 11-15 1-10 0 4 5 6 7		
5	150"	66-150 46-65 36-45 1-35 0 4 5 6 7		
6	150"	81-150 66-80 56-65 1-55 0 4 5 6 7		
7	150"	91-150 66-90 56-65 1-55 0 4 5 6 7		

WB
Block Design

Design	Time	Score	Help Step	
			Time	R or W
1	75"	11-15 6-10 1-5 0 3 4 5 6		
2	75"	11-15 6-10 1-5 0 3 4 5 6		
3	75"	11-15 6-10 1-5 0 3 4 5 6		
4	75"	16-25 11-15 1-10 0 3 4 5 6		
5	150"	36-50 26-35 1-25 0 3 4 5 6		
6	150"	51-80 41-50 1-40 0 3 4 5 6		
7	195"	101-140 81-100 1-80 0 3 4 5 6		

Appendix B.--Recording Form used in Experiment 1 for WB-WISC Order

		1		3		5	7	9
I. WB	Raw S.	______	S.S.	______	Help Items	______	______	______
II. WISC	Raw S.	______	S.S.	______	Help Items	______	______	______
		2		4		6	8	10

Name:
Age:
Sex:

Date:
Examiner:
Group:

WB
Block Design

Design	Time	Score	Help Step Time	Help Step R or W
1	75"	11-15 6-10 1-5 0 3 4 5 6		
2	75"	11-15 6-10 1-5 0 3 4 5 6		
3	75"	11-15 6-10 1-5 0 3 4 5 6		
4	75"	16-25 11-15 1-10 0 3 4 5 6		
5	150"	36-50 26-35 1-25 0 3 4 5 6		
6	150"	51-80 41-50 1-40 0 3 4 5 6		
7	195"	101-140 81-100 1-80 0 3 4 5 6		

WISC
Block Design

Design	Time	Score	Help Step Time	Help Step R or W
A	45"	0 1 2		
B	45"	0 1 2		
C	45"	0 1 2		
1	75"	21-75 16-20 11-15 1-10 0 4 5 6 7		
2	75"	21-75 16-20 11-15 1-10 0 4 5 6 7		
3	75"	26-75 21-25 16-20 1-15 0 4 5 6 7		
4	75"	21-75 16-20 11-15 1-10 0 4 5 6 7		
5	150"	66-150 46-65 36-45 1-35 0 4 5 6 7		
6	150"	81-150 66-80 56-65 1-55 0 4 5 6 7		
7	150"	91-150 66-90 56-65 1-55 0 4 5 6 7		

Appendix C.--Recording Form for Incorrect WB BD used in Experiment 1

✓ = correct placement, R = red, W = white

Name:__________________________________

WB

(Design Before Help)

1

2

3

4

5

6

7

Appendix D.--Recording Form for Incorrect WISC BD used in Experiment 1

✓ = correct placement, R = red, W = white

Name: ____________________

WISC
(Design Before Help)

A

B

C

1

2

3

4

5

6

7

Appendix E.--Table 44

Raw Data for Experiment 1

Subject	Sex	Age (Mos.)	Condition	Examiner	1st Admin.	2nd Admin.	Total	Help Items	SCAT (V)	SCAT (Q)	SCAT (Total)	G.P.A. 6/66	G.P.A. 1/67
1	1	169	1	1	11	9	20	-	273	269	272	2.50	1.75
2	1	164	4	1	11	12	23	1	258	264	263	2.00	1.33
3	2	169	10	1	10	13	23	1	292	260	273	2.75	2.33
4	1	161	7	1	10	13	23	1	261	277	270	2.50	2.67
5	2	170	6	1	12	13	25	-	265	264	267	2.20	2.17
6	2	172	5	1	8	9	17	3	254	275	266	2.25	3.17
7	2	168	6	1	8	8	16	-	258	275	268	3.25	2.50
8	1	164	9	3	12	13	25	1	273	273	273	2.00	1.40
9	2	161	7	1	6	9	15	3	258	268	265	3.00	2.50
10	2	160	6	3	10	12	22	-	258	276	268	1.83	1.67
11	1	171	3	1	3	9	12	2	262	262	265	1.80	2.33
12	2	167	9	3	10	7	17	1	258	267	264	1.80	1.00
13	2	158	9	1	13	14	27	1	262	279	271	-	1.80
14	2	162	5	1	11	11	22	2	261	284	273	1.50	1.67
15	2	161	1	1	10	11	21	-	258	272	267	1.25	1.33
16	1	162	2	1	7	8	15	2	270	280	275	3.00	1.40
17	2	160	4	1	10	12	22	2	270	272	272	3.50	2.83
18	2	166	7	1	11	16	27	1	263	275	270	1.75	2.80
19	1	169	2	1	7	3	10	3	255	292	272	2.75	2.50
20	1	177	9	1	9	11	20	2	265	253	263	1.40	1.00
21	2	173	7	1	10	12	22	2	259	279	270	3.40	2.67
22	1	180	6	1	7	15	22	-	258	270	266	1.50	2.00
23	1	179	5	1	9	10	19	1	258	264	263	1.50	1.00
24	2	167	4	1	11	9	20	2	258	267	265	1.80	2.33
25	2	167	8	1	8	8	16	2	265	254	263	1.20	1.67
26	2	169	1	1	10	14	24	-	263	266	267	3.40	3.17
27	2	166	9	1	12	12	24	1	270	275	273	2.20	2.17
28	2	165	7	1	10	11	21	1	264	275	271	3.20	3.00
29	1	174	8	1	9	10	19	2	274	265	270	1.00	1.33
30	2	159	1	1	6	7	13	-	266	268	269	2.20	1.80
31	1	173	4	1	9	10	19	2	258	284	271	2.50	2.33
32	2	160	8	1	9	4	13	2	266	279	273	2.00	2.00

(Table 44 continued next page)

Table 44--Continued

Subject	English 6/66	English 1/67	Math. 6/66	Math. 1/67	Soc. St. 6/66	Soc. St. 1/67	Science 6/66	Science 1/67	Spanish 6/66	Spanish 1/67	A. & C. 6/66	A. & C. 1/67	French 6/66	French 1/67	Hmkng. 6/66	Hmkng. 1/67	Latin 6/66	Latin 1/67	Mec. Dr. 6/66	Mec. Dr. 1/67	Shop 6/66	Shop 1/67	Spch. Arts 6/66	Spch. Arts 1/67	Typing 6/66	Typing 1/67
1	3	2	2	2	3	2	-	1	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	2	1	2	2	2	1	-	1	2	1	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-
3	3	3	2	2	3	2	-	2	3	2	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-
4	2	3	2	3	3	3	-	2	3	2	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-
5	2	3	2	1	2	2	-	2	2	2	-	-	-	-	3	3	-	-	-	-	-	-	-	-	-	-
6	2	3	3	2	2	4	-	3	-	4	2	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-
7	3	3	3	2	3	2	-	2	4	2	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-
8	2	1	2	2	2	1	-	2	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	3	2	3	3	3	2	-	2	3	3	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-
10	1	1	2	2	2	1	-	1	-	2	2	-	2	-	2	3	-	-	-	-	-	-	-	-	-	-
11	2	3	1	2	2	3	-	2	1	2	-	-	-	-	-	-	-	-	3	-	-	-	-	2	-	-
12	2	2	1	1	1	0	-	1	2	1	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	3	2	2	2	-	-	-	1	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	2	2	2	2	2	2	-	0	0	0	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-
15	1	1	1	2	1	1	2	1	-	1	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-
16	3	1	4	2	3	2	-	2	2	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	4	4	2	3	4	2	-	2	4	3	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-
18	2	3	1	4	2	3	-	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19	2	2	3	3	2	2	-	2	4	4	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-
20	1	2	0	0	1	0	-	0	2	1	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21	4	2	4	3	3	4	-	3	2	2	-	-	-	-	4	-	-	-	-	-	-	-	-	2	-	-
22	2	2	1	2	1	2	-	-	2	-	-	2	-	-	-	-	-	-	-	-	-	2	-	-	-	-
23	2	2	1	1	2	0	-	2	1	0	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	2	3	2	2	1	2	2	1	-	2	2	-	-	-	-	4	-	-	-	-	-	-	2	-	-	-
25	2	2	0	1	1	1	-	1	1	2	-	-	-	-	2	3	-	-	-	-	-	-	-	-	-	-
26	3	3	3	3	4	2	-	3	3	4	4	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-
27	2	2	2	2	2	2	2	2	-	2	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	3	3	3	3	3	3	-	2	3	3	4	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-
29	1	2	1	1	0	1	-	1	0	0	3	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-
30	3	3	1	2	3	1	-	1	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31	3	2	3	3	2	2	-	2	2	2	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-
32	2	3	2	1	2	3	-	1	2	2	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-

(Table 44 continued next page)

Table 44--Continued

Subject	Sex	Age (Mos.)	Condition	Examiner	1st Admin.	2nd Admin.	Total	Help Items	SCAT (V)	SCAT (Q)	SCAT (Total)	G.P.A. 6/66	G.P.A. 1/67
33	2	167	5	1	12	13	25	1	269	269	270	1.80	2.17
34	2	159	10	1	10	17	27	2	262	266	266	2.25	2.00
35	2	158	2	3	9	9	18	2	277	268	273	2.80	2.00
36	2	169	4	1	10	11	21	1	272	267	270	3.00	2.33
37	2	161	4	1	4	11	15	2	256	262	261	2.00	2.00
38	2	162	4	3	13	15	28	1	264	269	272	3.20	2.83
39	2	166	3	1	6	7	13	2	268	269	270	3.25	3.17
40	1	162	6	1	8	11	19	-	261	268	267	2.00	1.00
41	2	170	5	3	6	8	14	2	255	275	266	2.60	2.33
42	2	168	9	1	10	10	20	2	258	262	262	4.00	2.00
43	1	163	10	1	12	12	24	1	269	281	275	2.50	2.33
44	2	169	8	1	8	8	16	2	243	274	260	1.50	1.20
45	1	164	9	1	11	13	24	1	261	274	269	0.75	1.50
46	2	170	8	3	12	15	27	1	266	277	273	-	2.17
47	1	161	5	1	14	13	27	1	265	275	271	1.25	1.67
48	2	171	9	3	7	9	16	3	263	279	272	2.00	2.50
49	2	166	6	3	3	8	11	-	281	272	275	2.60	2.33
50	1	159	9	1	6	6	12	3	263	272	269	1.50	2.17
51	1	160	4	1	11	12	23	1	268	272	271	2.40	2.20
52	2	162	3	1	9	11	20	2	281	272	275	-	2.17
53	2	170	3	1	14	16	30	1	262	274	270	2.25	1.50
54	1	165	2	1	12	10	22	1	277	270	274	2.75	2.83
55	1	159	10	1	7	11	18	3	258	270	266	2.80	1.83
56	2	158	9	1	12	16	28	1	266	272	270	2.17	1.50
57	2	168	3	1	11	15	26	1	263	262	265	2.75	2.20
58	2	168	7	1	7	6	13	3	258	268	265	2.40	1.50
59	2	169	10	1	8	10	18	3	265	268	269	-	2.00
60	2	173	8	1	11	6	17	1	258	264	263	2.00	2.00
61	2	177	5	1	9	7	16	2	256	268	267	1.50	1.33
62	2	178	9	2	13	17	30	1	266	277	273	-	2.17
63	1	171	4	1	6	8	14	2	273	272	273	2.00	2.33
64	2	160	1	3	7	5	12	-	266	277	273	3.25	2.80
65	2	165	1	3	8	10	18	-	268	270	270	3.00	2.17
66	1	166	10	1	12	10	22	1	274	274	274	2.25	1.67
67	1	176	6	1	11	13	24	-	260	279	270	2.00	1.67
68	2	161	2	1	10	11	21	2	259	273	268	3.50	2.33

(Table 44 continued next page)

Table 44--Continued

Subject	English 6/66	English 1/67	Math.6/66	Math.1/67	Soc. St. 6/66	Soc. St. 1/67	Science 6/66	Science 1/67	Spanish 6/66	Spanish 1/67	A. & C. 6/66	A. & C. 1/67	French 6/66	French 1/67	Hmkng. 6/66	Hmkng. 1/67	Latin 6/66	Latin 1/67	Mec. Dr. 6/66	Mec. Dr. 1/67	Shop 6/66	Shop 1/67	Spch. Arts 6/66	Spch. Arts 1/67	Typing 6/66	Typing 1/67
33	2	2	2	2	2	2	-	1	1	2	2	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-
34	3	2	1	2	2	2	-	1	3	2	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-
35	3	2	3	2	3	2	-	1	3	2	2	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-
36	4	3	2	2	4	3	-	1	2	3	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-
37	3	2	1	2	2	2	-	1	2	2	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-
38	4	4	3	3	3	2	-	2	4	2	2	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-
39	4	3	2	2	3	3	4	3	-	4	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-
40	2	1	2	1	2	1	1	1	-	1	-	-	-	-	-	-	-	-	-	-	3	1	-	-	-	-
41	3	3	2	1	3	1	3	3	-	4	2	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-
42	4	2	4	3	4	1	-	2	4	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	3	3	3	2	3	1	-	2	1	2	2	-	-	-	-	-	-	-	-	-	3	4	-	-	-	-
44	2	1	1	1	2	2	-	2	1	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-
45	1	1	1	2	1	0	-	-	0	-	-	2	-	-	-	-	-	-	-	-	-	2	-	-	-	-
46	2	2	0	3	-	1	1	1	-	2	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-
47	1	1	1	2	1	1	-	2	2	1	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-
48	3	3	1	2	2	2	2	2	-	3	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-
49	3	2	2	3	3	2	-	2	3	2	2	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-
50	2	2	1	2	2	3	-	2	1	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-
51	2	2	2	1	2	3	-	2	3	3	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-
52	-	2	-	2	-	1	-	2	-	3	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-
53	2	0	3	2	2	0	-	2	2	1	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-
54	3	3	2	2	3	2	3	2	-	4	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-
55	3	2	3	2	2	2	-	1	2	2	4	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-
56	3	2	2	2	3	0	-	1	0	1	-	3	-	-	3	-	-	-	-	-	-	-	2	-	-	-
57	3	3	2	1	3	2	-	1	-	4	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-
58	3	2	1	2	3	1	-	1	3	2	2	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
59	1	3	2	1	-	2	-	1	1	2	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-
60	3	3	2	1	2	1	-	2	1	-	2	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-
61	2	2	2	2	2	1	-	1	1	1	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
62	-	2	-	2	-	1	-	2	-	2	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-
63	2	3	2	2	2	3	-	2	2	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-
64	3	3	2	3	4	2	-	2	4	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
65	3	2	3	2	3	2	-	2	-	2	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-
66	2	1	2	2	3	1	-	2	2	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-
67	2	1	2	2	2	1	-	2	2	2	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-
68	4	2	3	3	3	3	-	1	4	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-

(Table 44 continued next page)

Table 44--Continued

Subject	Sex	Age (Mos.)	Condition	Examiner	1st Admin.	2nd Admin.	Total	Help Items	SCAT (V)	SCAT (Q)	SCAT (Total)	G.P.A. 6/66	G.P.A. 1/67
69	1	170	5	1	1	7	8	1	268	259	266	2.00	1.33
70	1	176	5	1	10	9	19	1	264	257	264	2.25	1.83
71	1	165	7	1	10	9	19	2	264	276	271	1.50	1.50
72	1	178	3	3	11	13	24	1	270	279	275	2.25	2.00
73	1	170	10	3	9	11	20	2	277	270	274	-	1.67
74	2	159	7	1	8	11	19	3	269	266	269	2.00	2.00
75	2	159	8	1	8	13	21	3	262	262	265	2.20	1.20
76	2	164	2	3	7	4	11	4	259	282	271	2.75	2.40
77	2	169	4	1	9	13	22	3	254	262	261	3.00	2.40
78	1	165	1	1	6	5	11	-	260	277	270	2.00	1.83
79	2	166	10	1	8	9	17	3	256	265	262	2.80	2.00
80	2	167	1	1	9	10	19	-	263	260	264	1.20	0.17
81	1	172	10	3	9	10	19	2	265	280	273	3.20	2.67
82	1	159	6	1	7	11	18	-	262	274	270	2.80	2.00
83	1	169	4	1	11	12	23	1	258	277	269	3.25	3.20
84	1	171	8	1	7	10	17	3	261	262	264	-	2.33
85	2	159	3	1	9	6	15	3	266	260	266	2.60	1.83
86	1	163	6	1	9	10	19	-	269	280	275	2.60	2.17
87	2	161	7	1	6	10	16	3	265	275	271	3.75	3.83
88	2	158	10	3	12	14	26	1	272	279	275	2.80	2.50
89	1	166	8	1	10	13	23	2	282	270	275	3.00	2.80
90	2	170	2	1	9	12	21	2	273	259	268	2.00	2.00
91	2	179	1	1	3	10	13	-	272	276	274	2.80	2.00
92	1	173	6	1	10	11	21	-	270	277	274	3.20	1.40
93	2	176	8	2	14	15	29	1	274	285	279	2.80	2.00
94	1	172	2	2	10	12	22	2	276	272	274	1.86	1.60
95	1	171	1	3	11	13	24	-	282	279	279	1.40	2.20
96	1	182	7	2	8	10	18	3	265	276	272	2.00	1.50
97	1	172	6	2	11	14	25	-	262	276	270	2.40	1.75
98	2	178	9	2	11	13	24	1	268	282	275	1.20	1.40
99	2	171	10	2	10	11	21	2	269	273	272	2.20	1.25
100	2	191	8	2	10	10	20	2	277	268	273	0.20	2.20
101	2	173	10	3	12	10	22	1	276	276	276	2.00	1.80
102	2	181	6	2	11	11	22	-	269	287	278	2.80	2.00
103	2	180	3	2	10	14	24	1	256	280	269	3.20	1.40
104	2	181	3	2	6	11	17	3	281	279	279	2.75	3.50

(Table 44 continued next page)

Table 44--Continued

Subject	English 6/66	English 1/67	Math.6/66	Math.1/67	Soc. St. 6/66	Soc. St. 1/67	Science 6/66	Science 1/67	Spanish 6/66	Spanish 1/67	A. & C. 6/66	A. & C. 1/67	French 6/66	French 1/67	Hmkng. 6/66	Hmkng. 1/67	Latin 6/66	Latin 1/67	Mec. Dr. 6/66	Mec. Dr. 1/67	Shop 6/66	Shop 1/67	Spch. Arts 6/66	Spch. Arts 1/67	Typing 6/66	Typing 1/67
69	2	2	2	1	2	1	2	1	-	1	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-
70	3	2	1	2	2	1	-	2	3	2	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-
71	1	1	2	1	1	2	-	2	2	1	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-
72	2	2	2	2	2	2	3	2	-	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-
73	2	1	3	3	-	1	-	1	-	1	2	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-
74	3	2	2	2	2	2	2	1	1	2	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-
75	4	2	1	1	2	0	-	1	2	2	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-
76	3	2	1	2	3	2	-	2	4	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-
77	3	2	2	2	3	3	-	3	4	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
78	2	2	2	2	2	2	-	1	2	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
79	2	3	2	1	3	0	-	1	4	4	3	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-
80	1	1	0	0	1	0	-	0	2	0	-	0	-	-	-	-	-	-	-	-	-	-	2	-	-	-
81	3	2	3	2	3	2	-	2	4	4	3	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-
82	3	2	3	2	3	2	-	1	3	2	2	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-
83	3	3	3	3	3	3	-	3	4	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84	2	2	3	3	-	2	-	2	2	2	2	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-
85	3	2	2	2	2	1	-	1	4	-	-	-	-	-	2	3	-	-	-	-	-	-	-	-	-	-
86	2	2	3	2	2	3	-	2	3	2	-	-	-	-	-	-	-	-	3	-	-	2	-	-	-	-
87	4	4	3	3	4	4	-	4	4	4	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-
88	3	3	3	3	4	2	-	2	3	2	1	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-
89	3	2	3	3	4	4	-	3	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
90	2	2	3	2	1	1	-	-	1	-	-	3	-	-	3	-	-	-	-	-	1	-	-	-	-	-
91	3	2	2	1	3	2	3	-	-	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
92	4	2	3	1	3	2	-	-	3	1	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
93	3	1	2	2	1	2	-	-	4	-	-	-	-	-	4	3	-	-	-	-	-	-	-	-	-	-
94	2	2	1	1	2	2	2	-	1	-	2	-	-	-	-	-	-	-	-	-	3	2	-	-	-	1
95	1	3	1	3	1	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	-	-	-	1
96	3	1	2	2	1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-
97	2	1	2	2	2	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	3	2	-	-	-	-
98	1	1	1	1	1	1	1	-	-	-	2	2	-	-	-	2	-	-	-	-	-	-	-	-	-	-
99	2	2	2	-	2	1	1	-	-	-	-	-	-	-	4	0	-	-	-	-	-	-	-	-	-	2
100	0	1	0	2	0	2	-	3	0	-	-	-	-	-	1	3	-	-	-	-	-	-	-	-	-	-
101	1	1	3	2	1	2	1	-	-	-	4	3	-	-	-	-	-	-	-	-	-	-	-	-	-	1
102	2	2	3	2	3	2	2	2	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	2
103	3	1	3	1	2	2	4	-	-	3	-	-	-	-	4	0	-	-	-	-	-	-	-	-	-	-
104	3	3	2	4	4	3	2	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

(Table 44 continued next page)

Table 44--Continued

Subject	Sex	Age (Mos.)	Condition	Examiner	1st Admin.	2nd Admin.	Total	Help Items	SCAT (V)	SCAT (Q)	SCAT (Total)	G.P.A. 6/66	G.P.A. 1/67
105	2	179	6	2	7	8	15	-	274	272	273	2.60	2.60
106	1	179	7	2	8	7	15	3	273	265	270	2.25	2.00
107	1	179	4	2	8	13	21	3	265	272	270	2.40	1.80
108	2	180	6	2	7	9	16	-	272	275	274	1.80	2.25
109	1	171	2	2	10	11	21	1	279	281	279	2.00	1.75
110	2	183	9	2	12	12	24	1	269	284	276	1.75	2.00
111	1	190	3	2	10	12	22	1	260	279	270	-	1.80
112	1	173	4	2	8	11	19	2	262	276	270	1.00	1.50
113	2	173	4	2	8	9	17	3	266	265	268	3.20	2.50
114	2	176	4	3	5	5	10	2	269	262	268	2.50	1.33
115	2	171	5	3	6	7	13	2	258	274	267	0.80	2.25
116	1	183	8	3	9	14	23	2	261	270	268	2.50	2.00
117	2	173	10	3	11	10	21	2	281	269	274	2.00	1.67
118	1	187	7	3	11	14	25	1	270	276	274	1.20	0.75
119	2	171	2	2	10	11	21	2	277	280	278	1.80	1.75
120	2	171	1	1	9	14	23	-	273	273	273	1.60	2.50
121	2	179	2	3	6	7	13	2	258	281	270	3.00	2.60
122	2	174	9	3	11	12	23	1	265	270	270	1.60	2.25
123	2	177	2	3	8	8	16	3	266	277	273	1.20	2.80
124	1	180	8	3	10	13	23	1	264	275	271	1.60	1.33
125	1	178	3	3	10	13	23	1	276	268	272	2.20	2.25
126	2	174	1	3	11	13	24	-	276	269	273	2.40	3.50
127	1	182	1	2	8	11	19	2	277	282	279	1.75	1.00
128	2	186	7	3	5	3	8	4	263	275	270	2.00	2.25
129	2	178	10	3	11	10	21	2	259	294	275	2.80	3.00
130	2	180	9	3	12	13	25	1	265	282	274	3.20	2.75
131	1	177	2	3	10	12	22	1	268	266	269	2.00	2.60
132	2	175	7	3	12	13	25	1	268	269	270	3.25	3.00
133	1	180	9	3	7	9	16	3	269	273	272	1.80	1.80
134	2	188	2	2	8	9	17	2	261	270	268	2.40	3.00
135	1	179	1	3	8	10	18	-	264	282	274	1.40	2.00
136	2	182	3	3	3	12	15	2	276	267	272	1.60	1.67
137	1	175	3	3	12	11	23	1	268	270	270	3.00	2.25
138	2	179	8	3	5	6	11	3	266	266	268	0.80	1.20
139	2	182	5	2	12	15	27	1	265	288	276	2.20	2.80
140	1	177	5	1	12	16	28	1	265	279	273	2.20	2.00

(Table 44 continued next page)

Table 44--Continued

Subject	English 6/66	English 1/67	Math. 6/66	Math. 1/67	Soc. St. 6/66	Soc. St. 1/67	Science 6/66	Science 1/67	Spanish 6/66	Spanish 1/67	A. & C. 6/66	A. & C. 1/67	French 6/66	French 1/67	Hmkng. 6/66	Hmkng. 1/67	Latin 6/66	Latin 1/67	Mec. Dr. 6/66	Mec. Dr. 1/67	Shop 6/66	Shop 1/67	Spch. Arts 6/66	Spch. Arts 1/67	Typing 6/66	Typing 1/67
105	3	3	3	2	2	2	1	-	-	2	-	-	-	-	4	4	-	-	-	-	-	-	-	-	-	-
106	3	3	2	2	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
107	2	1	3	3	1	1	-	-	4	-	-	-	-	-	-	-	-	-	-	-	2	2	-	-	-	2
108	2	2	1	2	1	2	-	-	3	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
109	2	1	2	2	2	2	3	-	1	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-
110	2	2	2	2	2	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
111	-	2	-	1	-	1	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	2	-	-	-	-
112	1	1	1	2	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-
113	3	3	2	2	3	2	-	-	4	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	3
114	3	1	2	-	2	2	-	-	3	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
115	1	3	0	3	1	2	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1
116	3	1	2	3	2	2	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-
117	2	2	1	-	2	2	2	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	1
118	2	0	1	-	1	0	0	-	-	-	-	1	-	-	-	-	-	-	-	-	2	2	-	-	-	-
119	2	0	1	-	1	1	1	-	-	2	-	-	-	-	4	4	-	-	-	-	-	-	-	-	-	-
120	1	3	2	2	1	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	2	-	-	-
121	2	2	3	4	2	2	-	-	4	-	-	-	-	-	4	3	-	-	-	-	-	-	-	-	-	2
122	2	3	1	2	1	1	1	-	-	-	-	-	-	-	3	3	-	-	-	-	-	-	-	-	-	-
123	2	2	0	3	1	2	1	-	-	-	-	-	-	-	2	4	-	-	-	-	-	-	-	-	-	3
124	2	1	1	-	2	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	-	-	-	-
125	2	2	1	-	3	3	-	-	4	-	-	2	-	-	-	-	-	-	-	-	-	2	-	-	1	-
126	2	4	2	4	2	3	-	-	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
127	2	1	1	2	2	0	2	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
128	3	3	2	2	2	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
129	3	3	3	3	2	2	-	-	3	-	-	-	-	-	3	4	-	-	-	-	-	-	-	-	-	-
130	4	3	2	3	2	2	-	-	4	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-
131	2	3	1	2	3	3	2	2	-	-	-	-	-	-	-	-	-	-	-	-	2	3	-	-	-	-
132	4	3	2	2	3	3	-	-	4	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
133	2	2	2	1	2	2	-	-	2	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-	1	-
134	2	2	2	2	2	3	-	-	4	4	-	-	-	-	2	4	-	-	-	-	-	-	-	-	-	-
135	2	1	1	3	1	2	-	-	1	-	-	-	-	-	-	-	-	-	-	-	2	2	-	-	-	-
136	2	1	2	-	1	1	1	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	2	-
137	3	2	3	2	3	2	-	-	2	-	-	-	4	-	-	-	-	-	-	-	-	3	-	-	-	-
138	1	0	1	2	0	1	-	-	1	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	1	-
139	2	2	3	3	1	2	1	-	-	-	-	-	-	4	4	-	-	-	-	-	-	-	-	-	-	3
140	3	1	1	3	1	2	-	-	-	-	3	1	-	-	-	-	-	-	-	-	3	3	-	-	-	-

(Table 44 continued next page)

Table 44--Continued

Subject	Sex	Age (Mos.)	Condition	Examiner	1st Admin.	2nd Admin.	Total	Help Items	SCAT (V)	SCAT (Q)	SCAT (Total)	G.P.A. 6/66	G.P.A. 1/67
141	2	176	5	2	6	18	24	2	279	279	278	2.50	2.25
142	1	183	8	2	12	13	25	1	279	280	279	2.20	2.40
143	2	174	6	2	11	11	22	-	265	277	272	2.60	2.00
144	1	169	9	2	10	13	23	2	276	275	275	2.00	1.75
145	2	176	3	3	8	5	13	3	268	270	270	1.60	1.50
146	1	176	5	2	12	11	23	1	261	268	267	2.00	1.60
147	2	182	6	1	11	12	23	-	274	264	270	3.00	3.50
148	1	187	1	1	11	14	25	-	263	270	269	2.25	1.75
149	2	178	5	1	9	10	19	2	266	273	271	1.75	1.50
150	2	178	5	2	9	11	20	2	286	276	279	2.60	2.20
151	1	183	6	1	12	12	24	-	266	272	270	1.20	0.50
152	1	180	9	2	12	12	24	1	258	275	268	2.60	3.25
153	1	178	1	1	10	14	24	-	277	268	273	1.50	2.00
154	2	171	2	3	8	12	20	3	281	274	276	2.50	2.80
155	2	189	2	2	10	10	20	1	265	265	267	2.25	2.50
156	2	171	10	2	9	10	19	3	268	277	273	1.40	1.80
157	1	176	9	1	11	11	22	1	272	288	279	2.50	2.25
158	1	183	4	2	10	11	21	2	273	281	277	3.75	2.50
159	1	181	8	2	9	15	24	2	265	285	278	2.20	1.80
160	2	173	4	2	9	13	22	2	276	277	276	3.00	2.60
161	1	176	2	1	6	12	18	2	260	301	277	3.25	2.25
162	2	179	9	1	7	5	12	3	276	262	270	2.17	2.50
163	1	183	2	1	10	10	20	2	259	273	268	2.40	1.75
164	1	178	3	1	9	12	21	3	270	276	274	2.75	3.40
165	2	171	8	2	10	8	18	2	274	276	275	3.20	2.20
166	2	177	8	2	9	9	18	2	279	280	279	2.00	1.75
167	1	189	7	2	11	14	25	1	272	287	279	2.00	2.25
168	1	182	9	3	11	10	21	1	274	279	276	2.00	1.40

(Table 44 continued next page)

Table 44--Continued

Subject	English 6/66	English 1/67	Math. 6/66	Math. 1/67	Soc. St. 6/66	Soc. St. 1/67	Science 6/66	Science 1/67	Spanish 6/66	Spanish 1/67	A. & C. 6/66	A. & C. 1/67	French 6/66	French 1/67	Hmkng. 6/66	Hmkng. 1/67	Latin 6/66	Latin 1/67	Mec. Dr. 6/66	Mec. Dr. 1/67	Shop 6/66	Shop 1/67	Spch. Arts 6/66	Spch. Arts 1/67	Typing 6/66	Typing 1/67
141	3	2	3	2	1	2	-	-	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
142	3	2	2	2	1	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3	-	-	-	3
143	3	2	2	-	2	1	-	-	4	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-
144	2	2	1	2	3	2	2	-	-	1	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
145	2	1	1	-	0	2	-	-	1	-	-	2	-	-	4	-	-	-	-	-	-	-	-	-	-	1
146	2	2	2	2	2	2	-	-	2	1	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	1
147	3	4	2	3	2	3	-	-	4	4	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-
148	3	1	2	2	2	2	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-
149	1	1	3	2	1	1	2	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
150	3	2	2	1	3	2	2	-	-	3	-	-	-	-	-	3	-	-	-	-	-	-	-	-	3	-
151	2	1	1	0	1	0	-	-	0	-	-	-	-	-	-	-	-	-	-	-	2	1	-	-	-	-
152	2	3	3	4	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	4	4	-	-	-	-
153	1	1	3	1	1	2	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-
154	2	3	3	2	3	2	2	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
155	3	1	1	-	2	1	-	-	-	4	-	-	-	-	3	4	-	-	-	-	-	-	-	-	-	-
156	2	2	1	1	1	2	1	-	-	-	-	-	-	-	2	3	-	-	-	-	-	-	-	-	-	1
157	2	2	3	2	4	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-
158	4	2	4	4	4	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
159	2	1	3	3	2	1	2	-	-	2	-	-	-	-	-	-	-	-	-	-	2	2	-	-	-	-
160	3	3	3	3	3	2	2	-	-	2	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	3
161	3	2	4	4	3	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
162	3	3	2	1	2	2	-	-	2	-	-	-	-	-	2	-	-	-	-	-	-	-	2	-	-	4
163	3	2	2	1	2	2	-	-	3	-	-	-	-	-	-	-	-	-	-	-	2	2	-	-	-	-
164	3	3	4	4	3	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	4
165	3	2	3	2	3	2	-	-	3	4	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	1
166	4	2	3	4	1	2	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-
167	2	2	2	2	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	2	3	-	-	-	-
168	2	2	2	1	1	1	2	-	-	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1

(Table 44 continued next page)

Table 44--Continued

Subject	Sex	Age (Mos.)	Condition	Examiner	1st Admin.	2nd Admin.	Total	Help Items	SCAT (V)	SCAT (Q)	SCAT (Total)	G.P.A. 6/66	G.P.A. 1/67
169	1	178	8	3	12	12	24	1	281	277	278	3.50	3.00
170	2	182	2	1	5	7	12	2	276	284	279	3.00	2.80

(Table 44 continued next page)

Table 44--Continued

Subject	English 6/66	English 1/67	Math.6/66	Math.1/67	Soc. St. 6/66	Soc. St. 1/67	Science 6/66	Science 1/67	Spanish 6/66	Spanish 1/67	A. & C. 6/66	A. & C. 1/67	French 6/66	French 1/67	Hmkng. 6/66	Hmkng. 1/67	Latin 6/66	Latin 1/67	Mec. Dr. 6/66	Mec. Dr. 1/67	Shop 6/66	Shop 1/67	Spch. Arts 6/66	Spch. Arts 1/67	Typing 6/66	Typing 1/67
169	4	3	4	4	2	3	-	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
170	3	3	2	3	3	3	-	-	-	4	4	-	-	-	3	-	-	-	-	-	-	-	-	-	-	1

Appendix F.--Recording Form for WB BD used in Experiment 2

WB BD 1. RS______ 2. S.S______ 3. Help Steps______ 4. Help Items______ 5.______ 6.______ 7.______
Name:__________ Date:__________
Age:__________ Examiner:__________
Sex:__________ Group: Exp Cont Order:__________

WB
Block Design

Design	Time		Score					Help Step 1			Help Step 2		Help Step 3	
								Time		R or W	Time	R or W	Time	R or W
1	75"		0	3	11-15 4	6-10 5	1-5 6	37"						
2	75		0	3	11-15 4	6-10 5	1-5 6	37						
3	75		0	3	11-15 4	6-10 5	1-5 6	37						
4	75		0	3	16-25 4	11-15 5	1-10 6	37						
5	150		0	3	36-50 4	26-35 5	1-25 6	75						
6	150		0	3	51-80 4	41-50 5	1-40 6	75						
7	195		0	3	101-140 4	81-100 5	1-80 6	97						

Appendix G.--Recording Form for WISC BD used in Experiment 2

WISC BD 1. RS______ 2. S.S______ 3. Help Steps______ 4. Help Items______ 5.______ 6.______ 7.____
Name:______________________ Date:______________________
Age:______________________ Examiner:______________________
Sex:______________________ Group: Exp Cont______________________ Order:______________________

WISC
Block Design

Design	Time		Score	Help Step 1		Help Step 2		Help Step 3	
				Time	R or W	Time	R or W	Time	R or W
A	45"		0 1 2	22"					
B	45		0 1 2	22					
C	45		0 1 2	22					
1	75		21-75 16-20 11-15 1-10 0 4 5 6 7	37					
2	75		21-75 16-20 11-15 1-10 0 4 5 6 7	37					
3	75		26-75 21-25 16-20 1-15 0 4 5 6 7	37					
4	75		21-75 16-20 11-15 1-10 0 4 5 6 7	37					
5	150		66-150 46-65 36-45 1-35 0 4 5 6 7	75					
6	150		81-150 66-80 56-65 1-55 0 4 5 6 7	75					
7	150		91-150 66-90 56-65 1-55 0 4 5 6 7	75					

Appendix H.--Recording Form for WB PA used in Experiment 2

WB PA 1.RS___ 2.SS___ 3. Help Steps___ 4. Help Items______
5.____ .____ 7.____
Name:__________ Date:__________
Age:__________ Examiner:__________
Sex:__________ Group: Exp Cont Order:__________
WB

Note: Arrange remaining pictures on
Design 1: 3-1
Design 2: 1-3-4

Note: Arrange remaining pictures on
Design 1: 3-1
Design 2: 1-4
Design 5: 3-2
Design 6: 3-1

Picture Arrangement

				Help Step 1		Help Step 2			Help Step 3		
	Time	Order	Score	Time	Order	Cards Arngd	Time	Order	Cards Arngd	Time	Order
1. House	60"		0 2 PAT	30"		2			2		
2. Hold Up	60		0 2 ABCD	30		2			2-3		
3. Elevator	60		0 2 LMNO	30		2			2-3		
4. Flirt	120		0 2 AJNET 3 JANET JNAET	60		4-1			4-1-3		
5. Taxi	120		1 41-120 31-40 21-30 1-20 0 SALEUM 2 3 4 5 SALMEU SAMEUL SALMUE 3 4 5 6 SALUEM SAMUEL	60		5-4-1			5-4-1-6		
6. Fish	120		1 41-120 31-40 21-30 1-20 0 EGFHIJ 2 3 4 5 EFGIHJ EFHGIJ 3 4 5 6 EFGHIJ	60		2-4-6			2-4-6-5		

Appendix I.--Recording Form for WISC PA used in Experiment 2

WISC PA 1.RS___ 2.SS___ 3. Help Steps___ 4. Help Items___
5.____ 6.____ 7.____
Name:____________ Date:______________
Age:____________ Examiner:___________
Sex:____________ Group: Exp Cont WISC Order:______

Picture Arrangement

						Note: On Design C, arrange remaining pictures 1-4-3			Note: On Design C, arrange remaining pictures 3-1 Design 3: 2-1 Design 7: 3-1		
				Help Step 1		Help Step 2			Help Step 3		
	Time	Order	Score	Time	Order	Cards Arngd	Time	Order	Cards Arngd	Time	Order
A. Dog	75" 1. 2.		0 1 ABC 2 ABC	37"		3			3		
B. Mother	75		0 1 OYT 2 TOY	37		2			2		
C. Train	60		0 IR 1 ON 2 IRON	30		2			2-4		
D. Scale	45		0 2 ABC	27		1			1		
1. Fire	45		11-15 6-10 1-5 0 4 5 6 7 FIRE	27		4			4-3		
2. Burglar	45		11-15 6-10 1-5 0 4 5 6 7 THUG	27		3			3-1		
3. Farmer	45		11-15 6-10 1-5 0 4 5 6 7 QRST or SQRT	27		4			4-3		
4. Picnic	45		11-15 6-10 1-5 0 4 5 6 7 EFGH or EFHG	27		2			2-4		
5. Sleeper	60		16-20 11-15 1-10 0 4 5 6 7 PERCY	30		2-4			2-4-1		
6. Gardener	75		21-30 16-20 1-15 0 4 5 6 7 FISHER or FSIHER	37		5-3-4			5-3-4-2		
7. Rain	75		21-30 16-20 1-15 0 2 4 5 6 7 MSTEAR ASTEMR MASTER	37		5-2-4			5-2-4-6		

Appendix J.--Recording Form for Incorrect WB BD used in Experiment 2

1 = Help Step one, 2 = Help Step two, 3 = Help Step three
R = Red, W = White, ✓ = Correct, 0 = No placement
Name:____________________ WB
Block Designs

1 1(1) 1(2) 1(3) 2 2(1) 2(2) 2(3)

3 3(1) 3(2) 3(3) 4 4(1) 4(2) 4(3)

5 5(1) 5(2) 5(3)

6 6(1) 6(2) 6(3)

7 7(1) 7(2) 7(3)

Appendix K.--Recording Form for Incorrect WISC BD used in Experiment 2

1 = Help Step one, 2 = Help Step two, 3 = Help Step three
R = Red, W = White, ✓= Correct, 0 = No placement

Name:____________________

WISC
Block Design

A A(1) A(2) A(3) B B(1) B(2) B(3)

C C(1) C(2) C(3) 1 1(1) 1(2) 1(3)

2 2(1) 2(2) 2(3) 3 3(1) 3(2) 3(3)

4 4(1) 4(2) 4(3)

5 5(1) 5(2) 5(3)

6 6(1) 6(2) 6(3)

7 7(1) 7(2) 7(3)

Appendix L.--Table 45

Raw Data for Experiment 2

Subject	Sex	Age (Mos.)	Condition	Examiner	PA 1st Admin.	PA 2nd Admin.	BD 1st Admin.	BD 2nd Admin.	Total 1st Admin.	Total 2nd Admin.	Total Score	Total BD Score	Total PA Score	SCAT (V)
1	2	158	5	4	10	11	6	8	16	19	35	14	21	269
2	1	152	5	3	8	9	12	10	20	19	39	22	17	261
3	1	157	5	3	13	12	10	11	23	23	46	21	25	256
4	2	150	5	3	7	13	9	10	16	23	39	19	20	245
5	1	156	5	3	11	8	12	15	23	23	46	27	19	263
6	1	185	5	4	11	9	9	14	20	23	43	23	20	254
7	2	156	5	3	9	14	13	17	22	31	53	30	23	256
8	1	157	5	3	10	14	9	8	19	22	41	17	14	268
9	2	155	5	3	6	9	8	7	14	16	30	15	15	239
10	2	158	5	3	13	14	6	6	19	20	39	12	27	262
11	2	179	5	3	12	13	10	11	22	24	46	21	25	264
12	1	152	5	3	9	11	13	12	22	23	45	25	20	260
13	2	160	5	3	11	13	9	12	20	25	45	21	24	262
14	2	158	5	4	10	10	6	5	16	15	31	11	20	258
15	2	159	5	1	9	10	10	12	19	22	41	22	19	261
16	1	157	5	1	11	17	13	14	24	31	55	27	28	269
17	1	167	5	3	10	12	11	13	21	25	46	23	22	247
18	2	151	5	4	8	7	12	14	20	21	41	26	15	254
19	1	160	5	4	7	11	8	11	15	22	37	19	18	260
20	2	181	5	2	12	10	6	7	18	17	35	13	22	256
21	2	150	5	4	11	12	9	9	20	21	41	18	23	251
22	2	153	8	4	6	7	14	11	20	18	38	25	13	263
23	2	151	8	4	8	9	9	10	17	19	36	19	17	257
24	1	158	8	2	5	11	9	12	14	23	37	21	16	250
25	2	159	8	2	8	8	8	11	16	19	35	19	16	260
26	1	153	8	3	13	8	9	13	22	21	43	22	21	257
27	2	157	8	4	10	11	6	6	16	17	33	12	21	258
28	1	151	8	4	10	8	10	11	20	19	39	21	18	261
29	1	167	8	1	12	11	11	12	23	23	46	23	23	263
30	2	154	8	1	12	10	11	10	23	20	43	21	22	263

(Table 45 continued next page)

Table 45--Continued

Subject	SCAT (Q)	SCAT (Total)	G.P.A. 6/66	G.P.A. 1/67	English 6/66	Soc. St. 6/66	Math. 6/66	English 1/67	Soc. St. 1/67	Math. 1/67	PA Help Items	PA Help Steps	BD Help Items	BD Help Steps
1	272	271	3.30	3.16	3	4	3	4	3	3	3	5	2	5
2	265	265	2.33	2.00	3	2	2	3	1	2	3	4	1	1
3	272	265	3.33	3.00	4	4	3	3	3	3	2	5	2	3
4	269	259	-	3.00	-	-	-	3	3	3	3	4	3	6
5	266	267	2.00	1.50	2	2	2	1	1	2	2	2	1	1
6	277	267	2.00	2.60	2	2	2	2	2	2	2	3	2	3
7	262	261	2.00	2.60	2	2	2	2	3	2	2	3	1	1
8	268	270	-	2.40	-	-	-	2	2	3	2	4	2	5
9	261	253	1.75	1.80	2	1	2	2	2	0	3	4	2	3
10	275	270	2.50	3.00	2	2	3	3	3	2	2	3	3	6
11	272	270	1.40	1.50	1	2	1	0	1	1	1	1	1	2
12	273	268	3.10	1.66	3	3	2	1	1	2	2	2	1	2
13	276	270	2.55	2.20	3	2	3	2	1	2	2	3	3	6
14	260	262	2.00	1.20	2	2	2	0	1	1	2	2	2	5
15	260	263	3.10	2.25	4	3	4	2	2	3	3	3	2	2
16	270	271	2.80	2.40	2	3	2	3	3	2	3	5	1	1
17	273	261	2.25	1.60	2	2	3	2	1	2	2	3	2	2
18	277	267	2.60	2.40	3	2	2	3	2	2	2	2	1	1
19	270	267	-	2.00	-	-	-	1	2	3	2	3	2	2
20	265	262	1.60	2.00	2	1	1	2	2	2	1	2	3	5
21	270	262	2.00	2.40	2	2	2	2	2	2	2	5	3	7
22	265	266	2.00	2.00	2	2	2	2	1	2	3	3	1	1
23	284	270	2.62	2.60	3	3	3	2	3	3	3	4	3	5
24	274	263	3.67	2.25	4	-	2	3	2	2	3	3	3	6
25	260	263	2.00	1.00	2	2	2	1	0	1	2	3	2	2
26	265	263	1.87	2.25	2	1	2	2	2	3	2	4	3	5
27	257	261	2.50	2.60	3	2	2	2	3	2	2	2	2	4
28	267	266	2.25	1.25	2	2	3	1	1	1	3	6	2	4
29	265	266	1.80	2.00	2	3	1	2	2	2	1	2	1	1
30	264	266	2.12	2.20	2	2	2	2	2	2	2	2	1	2

(Table 45 continued next page)

Table 45--Continued

Subject	Total Help Items	Total Help Steps	Science 6/66	Spanish 6/66	Reading 6/66	A. & C. 6/66	Handwrtg. 6/66	Spelling 6/66	Music 6/66	Shop 6/66	Hmkng. 6/66	Science 1/67	Spanish 1/67	Reading 1/67	A. & C. 1/67	Music 1/67	Shop 1/67	Hmkng. 1/67
1	5	10	3	3	3	3	4	4	3	-	-	-	4	-	2	3	-	-
2	4	5	3	-	2	2	2	3	2	-	-	-	2	-	-	-	-	-
3	4	7	2	4	3	4	3	-	3	-	-	-	-	3	-	-	-	-
4	6	10	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	3
5	3	3	-	-	2	2	2	2	2	-	-	-	2	-	-	-	-	-
6	4	6	-	-	2	2	2	2	2	-	-	-	4	-	-	3	-	-
7	3	4	-	-	2	2	2	2	2	-	-	-	-	4	-	-	-	2
8	4	9	-	-	-	-	-	-	-	-	-	-	2	-	-	-	3	-
9	5	7	-	-	2	2	2	1	2	-	-	-	-	3	2	-	-	-
10	5	9	-	-	3	2	3	3	2	-	-	-	-	4	-	-	-	-
11	2	3	1	-	-	-	-	-	-	-	2	-	-	-	-	4	-	-
12	3	4	2	3	3	4	3	4	4	-	-	-	2	2	-	2	-	-
13	5	9	3	3	2	-	2	2	3	-	-	-	3	-	3	-	-	-
14	4	7	-	-	2	2	2	2	2	-	-	-	2	-	2	-	-	-
15	5	5	2	4	4	2	2	4	2	-	-	-	-	2	-	-	-	-
16	4	6	3	2	3	4	2	4	3	-	-	-	2	2	-	-	-	-
17	4	5	-	-	2	2	2	2	3	-	-	-	1	-	-	-	2	-
18	3	3	2	3	2	4	3	3	2	-	-	-	2	3	-	-	-	-
19	4	5	-	-	-	-	-	-	-	-	-	-	2	-	2	-	-	-
20	4	7	-	3	-	-	-	-	-	-	1	-	2	-	-	-	-	2
21	5	12	-	-	2	2	2	2	2	-	-	-	-	3	3	-	-	-
22	4	4	2	-	2	2	2	2	2	-	-	-	-	3	2	-	-	-
23	6	9	-	-	3	2	2	3	2	-	-	-	2	-	-	3	-	-
24	6	9	-	-	4	4	4	-	4	-	-	-	2	-	-	-	-	-
25	4	5	-	-	2	2	2	2	2	-	-	-	2	-	-	1	-	-
26	5	9	-	-	2	2	2	2	2	-	-	-	2	-	-	-	-	-
27	4	6	-	-	2	2	3	3	3	-	-	-	-	4	2	-	-	-
28	5	10	-	-	3	2	2	2	2	-	-	-	2	-	-	-	-	-
29	2	3	2	2	2	2	1	1	2	-	-	-	1	-	3	2	-	-
30	3	4	-	-	2	2	2	3	2	-	-	-	3	-	2	-	-	-

(Table 45 continued next page)

Table 45--Continued

Subject	Sex	Age (Mos.)	Condition	Examiner	PA 1st Admin.	PA 2nd Admin.	BD 1st Admin.	BD 2nd Admin.	Total 1st Admin.	Total 2nd Admin.	Total Score	Total BD Score	Total PA Score	SCAT (V)
31	1	153	8	3	15	9	10	12	25	21	46	22	24	253
32	2	161	8	3	8	8	14	14	22	22	44	28	16	265
33	2	165	8	4	5	8	8	7	13	15	28	15	13	258
34	1	169	8	2	15	11	10	7	25	18	43	17	26	266
35	1	162	8	2	8	9	10	14	18	23	41	24	17	258
36	2	152	8	3	8	7	6	7	14	14	28	13	15	260
37	1	152	8	1	13	7	13	11	26	18	44	24	20	265
38	1	167	8	4	11	7	12	10	23	17	40	22	18	245
39	1	158	8	4	8	14	7	11	15	25	40	18	22	259
40	2	172	8	4	8	7	5	10	13	17	30	15	15	257
41	1	151	6	2	12	14	10	18	22	32	54	28	26	258
42	2	154	6	1	7	9	11	12	18	21	39	23	16	263
43	2	153	6	3	9	11	8	12	17	23	40	20	20	266
44	1	164	6	3	9	9	5	4	14	13	27	9	18	257
45	1	154	6	3	10	13	10	8	20	21	41	18	23	258
46	1	150	6	3	13	12	7	9	20	21	41	16	25	268
47	2	154	6	3	7	9	11	15	18	24	42	26	16	256
48	1	165	6	4	7	15	9	11	16	26	42	20	22	250
49	2	170	6	4	11	10	11	11	22	21	43	22	21	260
50	1	167	6	1	11	15	12	16	23	31	54	28	26	261
51	1	162	6	1	8	16	10	13	18	29	47	23	24	264
52	1	163	6	1	8	15	6	9	14	24	38	15	23	268
53	2	170	6	1	7	5	12	14	19	19	38	26	12	247
54	2	161	6	1	11	11	8	13	19	24	43	21	22	259
55	2	170	6	3	10	14	12	13	22	27	49	25	24	251
56	2	154	6	1	9	14	13	13	22	27	49	26	23	263
57	1	156	6	1	7	8	7	9	14	17	31	16	15	262
58	1	165	6	2	11	12	13	14	24	26	50	27	23	255
59	1	158	6	3	11	8	7	12	18	20	38	19	19	249
60	2	150	6	1	9	12	9	10	18	22	40	19	21	262
61	1	163	6	1	6	10	8	13	14	23	37	21	16	256
62	2	152	6	1	9	13	11	16	20	29	49	27	22	258
63	1	165	4	2	8	12	7	7	15	19	34	14	20	260
64	1	183	4	2	1	5	5	5	6	10	16	10	6	254
65	2	171	4	4	7	11	12	12	19	23	42	24	18	249
66	2	175	4	4	8	8	5	10	13	18	31	15	16	259

(Table 45 continued next page)

Table 45--Continued

Subject	SCAT (Q)	SCAT (Total)	G.P.A. 6/66	G.P.A. 1/67	English 6/66	Soc. St. 6/66	Math. 6/66	English 1/67	Soc. St. 1/67	Math. 1/67	PA Help Items	PA Help Steps	BD Help Items	BD Help Steps
31	281	268	-	1.80	-	-	-	2	2	2	1	1	3	5
32	270	270	3.50	3.60	4	3	3	4	4	4	3	5	1	2
33	266	264	1.83	1.60	2	2	2	2	1	2	2	4	2	4
34	242	260	1.00	1.20	1	0	0	1	2	0	1	1	2	3
35	280	270	2.20	1.80	2	2	1	3	1	1	2	2	3	5
36	275	269	3.00	1.80	2	2	3	2	3	1	2	4	2	4
37	267	268	2.70	2.83	3	3	2	3	3	3	1	1	0	0
38	269	259	-	3.20	-	-	-	4	3	3	2	3	1	1
39	266	265	2.00	1.00	2	2	2	1	1	0	2	3	2	2
40	269	265	2.00	2.20	2	2	2	2	2	2	2	2	2	3
41	259	261	2.00	2.00	2	2	2	2	2	1	1	1	2	2
42	273	270	3.50	3.40	3	3	3	3	3	4	3	3	1	2
43	269	270	2.40	2.20	2	2	2	2	2	2	2	3	3	3
44	248	258	2.00	1.80	2	2	2	2	2	1	1	3	3	7
45	276	268	2.25	3.25	2	2	3	4	2	3	1	1	1	3
46	267	269	2.00	2.60	2	2	2	3	3	2	1	2	3	5
47	265	262	2.00	2.00	2	2	2	2	2	2	2	3	1	1
48	277	265	2.40	1.80	1	2	1	2	2	1	2	3	2	5
49	267	266	2.25	1.50	3	2	1	3	1	0	2	3	1	3
50	272	268	2.40	2.50	3	3	2	2	4	2	1	1	1	2
51	284	274	2.50	2.40	2	4	3	2	3	2	1	1	2	2
52	266	269	2.80	2.40	3	4	2	3	3	2	2	2	3	6
53	277	263	2.10	1.60	2	2	3	1	1	2	2	3	1	2
54	264	264	3.50	2.80	3	3	3	3	2	3	2	2	3	3
55	287	269	3.00	1.60	3	3	3	1	1	3	2	3	1	1
56	273	270	2.00	2.25	2	2	2	2	2	2	1	3	1	1
57	259	263	2.13	1.84	1	1	1	2	1	2	2	3	3	7
58	272	265	1.86	1.60	2	2	2	2	1	2	2	4	1	1
59	264	258	1.87	2.25	2	2	2	2	2	2	1	1	2	3
60	277	271	3.33	3.00	4	3	3	4	2	2	1	3	2	6
61	276	267	2.25	2.50	2	2	1	2	2	2	3	4	2	2
62	270	266	2.80	2.83	2	2	2	3	2	3	2	3	1	1
63	269	267	2.40	2.20	2	2	3	2	3	2	-	-	-	-
64	259	259	1.75	1.20	1	2	2	1	1	1	-	-	-	-
65	265	259	1.50	2.40	2	1	1	3	2	1	-	-	-	-
66	265	264	1.80	2.50	2	2	1	3	1	2	-	-	-	-

(Table 45 continued next page)

Table 45--Continued

Subject	Total Help Items	Total Help Steps	Science 6/66	Spanish 6/66	Reading 6/66	A. & C. 6/66	Handwrtg. 6/66	Spelling 6/66	Music 6/66	Shop 6/66	Hmkng. 6/66	Science 1/67	Spanish 1/67	Reading 1/67	A. & C. 1/67	Music 1/67	Shop 1/67	Hmkng. 1/67
31	4	6	-	-	-	-	-	-	-	-	-	-	1	-	2	-	-	-
32	4	7	3	4	4	3	4	4	3	-	-	-	4	2	-	-	-	-
33	4	8	-	-	1	2	-	-	2	-	-	-	2	-	-	-	-	-
34	3	4	-	3	-	-	-	-	-	1	-	-	2	-	-	-	1	-
35	5	7	-	-	4	-	-	-	-	2	-	2	-	-	-	-	2	-
36	4	8	3	3	3	3	3	4	4	-	-	-	1	2	-	-	-	-
37	1	1	3	3	3	2	3	3	2	-	-	-	2	-	3	3	-	-
38	3	4	-	-	-	-	-	-	-	-	-	-	-	3	-	3	-	-
39	4	5	-	-	2	2	2	2	2	-	-	-	-	2	-	-	-	-
40	4	5	-	-	2	2	2	2	2	-	-	-	-	3	-	-	-	2
41	3	3	-	-	2	2	2	2	2	-	-	-	-	3	-	-	-	-
42	4	5	3	4	4	4	4	4	3	-	-	-	4	-	-	-	-	3
43	5	6	2	3	4	2	2	3	2	-	-	-	3	-	-	2	-	-
44	4	10	-	-	2	2	2	2	2	-	-	-	2	-	-	2	-	-
45	2	4	-	-	2	2	2	3	2	-	-	-	-	4	-	-	-	-
46	4	7	-	-	2	2	2	2	2	-	-	-	-	3	-	-	2	-
47	3	4	-	-	2	2	2	2	2	-	-	-	-	2	-	2	-	-
48	4	8	2	4	3	2	3	4	2	-	-	-	-	3	1	-	-	-
49	3	6	-	-	3	-	-	-	-	-	-	-	2	-	-	-	-	-
50	2	3	-	2	-	-	-	-	-	2	-	2	-	-	-	-	-	-
51	3	3	4	2	3	2	2	1	2	-	-	-	2	3	-	-	-	-
52	5	8	3	2	3	4	2	3	2	-	-	-	2	2	-	-	-	-
53	3	5	2	2	2	2	2	2	2	-	-	-	-	2	-	-	-	2
54	5	5	3	4	3	4	4	4	4	-	-	-	-	2	-	-	-	4
55	3	4	-	3	-	4	-	-	2	-	-	1	-	-	-	-	-	2
56	2	4	-	-	2	2	2	2	2	-	-	-	3	-	-	-	-	-
57	5	10	2	-	2	4	2	4	-	-	-	-	1	-	-	-	-	-
58	3	5	-	1	2	-	2	2	-	-	-	-	2	-	-	1	-	-
59	3	4	-	-	1	2	2	2	2	-	-	-	-	3	-	-	-	-
60	3	9	3	-	3	3	3	4	4	-	-	-	4	3	-	-	-	-
61	5	6	-	-	4	-	-	-	-	-	-	-	4	-	-	-	-	-
62	3	4	3	3	3	4	3	3	3	-	-	-	3	3	-	3	-	-
63	-	-	-	-	3	-	-	-	-	2	-	-	3	-	1	-	-	-
64	-	-	-	-	-	-	-	-	-	2	-	-	1	-	-	-	2	-
65	-	-	-	-	-	-	-	-	-	-	2	-	4	-	2	-	-	-
66	-	-	-	-	2	-	-	-	-	-	2	-	4	-	-	-	-	-

(Table 45 continued next page)

Table 45--Continued

Subject	Sex	Age (Mos.)	Condition	Examiner	PA 1st Admin.	PA 2nd Admin.	BD 1st Admin.	BD 2nd Admin.	Total 1st Admin.	Total 2nd Admin.	Total Score	Total BD Score	Total PA Score	SCAT (V)
67	1	152	4	3	9	7	8	9	17	16	33	17	16	263
68	2	152	4	4	3	5	7	5	10	10	20	12	8	252
69	1	161	4	4	12	7	7	8	19	15	34	15	19	259
70	1	159	4	4	9	6	6	7	15	13	28	13	15	262
71	2	160	4	1	10	12	8	11	18	23	41	19	22	263
72	1	160	4	2	9	4	10	12	19	16	35	22	13	258
73	2	151	4	1	7	6	10	13	17	19	36	23	13	250
74	1	153	4	2	11	7	13	11	24	18	42	24	18	253
75	2	153	4	4	9	6	9	7	18	13	31	16	15	263
76	1	151	4	4	6	5	7	5	13	10	23	12	11	265
77	2	159	4	4	8	11	9	7	17	18	35	16	19	261
78	1	153	4	2	13	7	13	15	26	22	48	28	20	259
79	2	152	4	1	8	14	12	12	20	26	46	24	22	256
80	2	154	4	1	8	6	10	9	18	15	33	19	14	269
81	2	151	4	2	12	9	14	13	26	22	48	27	21	262
82	2	156	4	2	4	9	7	12	11	21	32	19	13	258
83	2	158	7	1	5	8	8	12	13	20	33	20	13	254
84	2	160	7	1	8	11	9	12	17	23	40	21	19	268
85	1	151	7	1	10	11	9	14	19	25	44	23	21	260
86	2	178	7	4	6	6	5	9	11	15	26	14	12	253
87	1	169	7	2	8	10	8	10	16	20	36	18	18	266
88	2	162	7	2	8	9	12	12	20	21	41	24	17	257
89	1	161	7	2	10	12	7	10	17	22	39	17	22	252
90	1	150	7	1	7	12	9	12	16	24	40	21	19	258
91	2	152	7	1	8	8	9	11	17	19	36	20	16	259
92	1	157	7	1	10	8	9	10	19	18	37	19	18	259
93	1	149	7	2	7	12	8	10	15	22	37	18	19	256
94	1	159	7	1	11	8	8	14	19	22	41	22	19	251
95	2	149	7	2	7	10	10	12	17	22	39	22	17	248
96	2	153	7	4	7	10	11	10	18	20	38	21	17	259
97	2	155	7	4	8	17	7	10	15	27	42	17	25	254
98	2	156	3	3	9	9	7	13	16	22	38	20	18	277
99	2	165	3	3	11	9	12	15	23	24	47	27	20	266
100	2	171	3	4	11	9	11	11	22	20	42	22	20	265
101	1	152	3	4	7	9	9	12	16	21	37	21	16	266
102	1	149	3	1	8	10	11	11	19	21	40	22	18	261
103	2	162	3	4	8	12	4	6	12	18	30	10	20	256

(Table 45 continued next page)

Table 45--Continued

Subject	SCAT (Q)	SCAT (Total)	G.P.A. 6/66	G.P.A. 1/67	English 6/66	Soc. St. 6/66	Math. 6/66	English 1/67	Soc. St. 1/67	Math. 1/67	PA Help Items	PA Help Steps	BD Help Items	BD Help Steps
67	274	270	2.14	2.40	2	2	3	2	2	3	-	-	-	-
68	265	261	2.00	2.40	2	2	2	3	2	2	-	-	-	-
69	260	262	2.00	3.00	2	2	2	3	2	3	-	-	-	-
70	262	265	2.00	2.00	2	2	2	2	2	2	-	-	-	-
71	272	269	-	2.60	-	-	-	3	2	2	-	-	-	-
72	266	264	2.22	1.20	3	2	2	2	0	0	-	-	-	-
73	267	261	2.00	2.25	2	2	2	2	2	3	-	-	-	-
74	277	266	2.00	2.60	2	2	2	3	2	2	-	-	-	-
75	277	271	-	-	-	-	-	-	-	-	-	-	-	-
76	265	267	2.00	2.75	2	2	2	2	2	3	-	-	-	-
77	260	263	-	3.00	-	-	-	3	3	2	-	-	-	-
78	264	264	-	2.25	-	-	-	2	3	2	-	-	-	-
79	277	268	2.83	3.20	3	3	3	3	2	4	-	-	-	-
80	259	266	2.14	2.60	2	2	2	3	2	3	-	-	-	-
81	266	266	2.63	2.60	3	3	3	3	2	3	-	-	-	-
82	265	263	1.87	2.20	2	2	1	1	1	2	-	-	-	-
83	269	263	2.70	1.80	2	2	3	2	2	2	3	4	3	5
84	273	271	3.20	2.80	3	3	3	2	3	2	1	1	2	2
85	277	270	2.00	1.20	2	2	2	0	2	2	2	3	2	2
86	262	260	2.00	1.80	2	2	2	2	0	1	3	6	4	4
87	251	263	2.00	1.25	2	2	1	0	1	2	2	3	3	5
88	265	263	2.00	2.00	2	2	2	2	2	2	2	2	1	2
89	273	264	2.00	2.60	2	2	2	2	3	2	1	2	3	5
90	265	264	1.75	1.40	2	2	1	1	1	0	2	4	2	3
91	256	261	-	2.00	-	-	-	1	2	2	2	2	2	4
92	257	261	1.75	0.60	1	2	2	0	0	0	2	4	2	4
93	260	261	-	2.25	-	-	-	3	2	1	2	3	2	4
94	269	262	2.00	1.67	2	2	3	3	2	1	1	2	3	5
95	267	259	1.87	1.60	2	2	1	2	1	2	3	4	1	2
96	270	267	-	2.80	-	-	-	3	2	2	2	2	1	1
97	266	262	-	2.20	-	-	-	2	2	1	1	2	3	4
98	272	274	3.20	1.80	3	2	2	1	1	2	-	-	-	-
99	274	271	3.33	3.00	3	3	3	3	3	3	-	-	-	-
100	269	269	3.00	2.50	2	4	3	2	2	3	-	-	-	-
101	280	274	3.89	2.50	4	4	4	2	3	2	-	-	-	-
102	274	269	-	2.25	-	-	-	2	1	3	-	-	-	-
103	274	266	2.30	2.40	3	2	2	2	2	3	-	-	-	-

(Table 45 continued next page)

Table 45--Continued

Subject	Total Help Items	Total Help Steps	Science 6/66	Spanish 6/66	Reading 6/66	A. & C. 6/66	Handwrtg. 6/66	Spelling 6/66	Music 6/66	Shop 6/66	Hmkng. 6/66	Science 1/67	Spanish 1/67	Reading 1/67	A. & C. 1/67	Music 1/67	Shop 1/67	Hmkng. 1/67
67	-	-	-	2	2	-	2	2	-	-	-	-	2	-	3	-	-	-
68	-	-	-	-	2	2	2	2	2	-	-	-	-	3	2	-	-	-
69	-	-	-	-	2	2	2	2	2	-	-	-	-	4	3	-	-	-
70	-	-	-	-	2	2	2	2	2	-	-	-	-	3	-	-	1	-
71	-	-	-	-	-	-	-	-	-	-	-	-	4	2	-	-	-	-
72	-	-	2	-	2	2	2	3	2	-	-	-	-	3	-	-	1	-
73	-	-	-	-	2	2	2	2	2	-	-	-	2	-	-	-	-	-
74	-	-	-	-	2	2	2	2	2	-	-	-	3	-	-	3	-	-
75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
76	-	-	-	-	2	2	2	2	2	-	-	-	-	4	-	-	-	-
77	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-
78	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-
79	-	-	3	-	3	-	-	2	-	-	-	-	3	-	-	-	-	4
80	-	-	2	-	2	-	2	3	-	-	-	-	-	2	-	-	-	3
81	-	-	-	-	3	2	2	3	2	-	-	-	-	3	-	2	-	-
82	-	-	-	-	2	2	2	2	2	-	-	-	4	-	-	-	-	3
83	6	9	3	3	3	3	3	3	2	-	-	-	1	2	-	-	-	-
84	3	3	2	4	3	3	3	4	4	-	-	-	3	-	4	-	-	-
85	4	5	2	2	2	2	2	2	2	-	-	-	0	-	2	-	-	-
86	7	10	-	-	1	-	-	-	-	-	3	-	4	-	-	-	-	-
87	5	8	-	-	3	-	-	-	-	-	-	-	2	-	-	-	-	-
88	3	4	-	-	2	2	2	2	2	-	-	-	2	-	-	-	-	-
89	4	7	-	-	2	2	2	2	2	-	-	-	-	3	3	-	-	-
90	4	7	-	-	2	2	2	1	2	-	-	-	-	2	3	-	-	-
91	4	6	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	3
92	4	8	-	-	2	2	2	1	2	-	-	-	-	2	-	-	1	-
93	4	7	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
94	4	7	2	2	1	3	1	2	2	-	-	-	0	1	-	3	-	-
95	4	6	-	-	2	2	2	2	2	-	-	-	2	-	-	1	-	-
96	3	3	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	3
97	4	6	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	2
98	-	-	3	4	4	4	3	4	3	-	-	-	2	-	3	-	-	-
99	-	-	3	-	3	4	4	3	4	-	-	-	3	3	-	-	-	-
100	-	-	-	-	-	3	-	-	-	-	3	-	-	-	-	-	-	-
101	-	-	3	-	4	4	4	4	4	-	-	-	3	3	-	2	-	-
102	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
103	-	-	3	2	2	2	2	3	2	-	-	-	2	-	-	-	-	3

(Table 45 continued next page)

Table 45--Continued

Subject	Sex	Age (Mos.)	Condition	Examiner	PA 1st Admin.	PA 2nd Admin.	BD 1st Admin.	BD 2nd Admin.	Total 1st Admin.	Total 2nd Admin.	Total Score	Total BD Score	Total PA Score	SCAT (V)
104	1	151	3	4	11	10	10	14	21	24	45	24	21	260
105	2	146	3	4	7	6	10	11	17	17	34	21	13	263
106	1	153	3	4	10	12	8	12	18	24	42	20	22	259
107	2	155	3	1	7	9	11	11	18	20	38	22	16	264
108	1	156	3	4	8	5	4	10	12	15	27	14	13	256
109	2	148	3	4	9	3	9	10	18	13	31	19	12	260
110	1	161	3	4	7	11	9	12	16	23	39	21	18	268
111	1	154	3	3	11	13	10	10	21	23	44	20	24	255
112	1	159	3	4	7	9	6	13	13	22	35	19	16	242
113	2	165	2	3	9	10	9	10	18	20	38	19	19	262
114	2	165	2	3	5	10	11	17	16	27	43	28	15	254
115	1	157	2	3	4	11	3	4	7	15	22	7	15	262
116	1	181	2	2	7	18	6	9	13	27	40	15	25	249
117	1	169	2	2	7	13	11	11	18	24	42	22	20	255
118	2	163	2	3	7	14	12	14	19	28	47	26	21	261
119	2	162	2	1	8	12	10	9	18	21	39	19	20	246
120	1	160	2	1	11	9	10	14	21	23	44	24	20	256
121	2	155	2	1	7	7	9	13	16	20	36	22	14	263
122	1	155	2	1	9	15	11	14	20	29	49	25	24	260
123	2	156	2	3	7	11	14	11	21	22	43	25	18	261
124	2	158	2	1	7	8	9	14	16	22	38	23	15	258
125	2	164	2	3	9	17	10	13	19	30	49	23	26	254
126	2	154	2	3	7	8	7	11	14	19	33	18	15	258
127	1	152	2	3	4	10	10	6	14	16	30	16	14	264
128	2	157	2	4	4	8	10	12	14	20	34	22	12	262
129	1	159	2	1	12	12	10	14	22	26	48	24	24	262
130	1	155	2	2	7	11	10	12	17	23	40	22	18	251
131	1	153	1	3	10	10	7	5	17	15	32	12	20	250
132	2	157	1	3	12	8	9	14	21	22	43	23	20	258
133	1	168	1	2	10	7	6	10	16	17	33	16	17	257
134	1	156	1	1	8	7	9	11	17	18	35	20	15	265
135	1	167	1	1	11	13	12	13	23	26	49	25	24	250
136	1	159	1	4	11	7	11	10	22	17	39	21	18	250
137	2	161	1	3	6	8	6	9	12	17	29	15	14	260
138	1	160	1	1	9	10	10	11	19	21	40	21	19	264
139	2	165	1	1	11	8	9	9	20	17	37	18	19	264
140	2	150	1	1	8	7	8	10	16	17	33	18	15	260

(Table 45 continued next page)

Table 45--Continued

Subject	SCAT (Q)	SCAT (Total)	G.P.A. 6/66	G.P.A. 1/67	English 6/66	Soc. St. 6/66	Math.6/66	English 1/67	Soc. St. 1/67	Math.1/67	PA Help Items	PA Help Steps	BD Help Items	BD Help Steps
104	261	263	-	2.25	-	-	-	2	2	2	-	-	-	-
105	270	269	2.25	2.60	3	2	2	2	2	3	-	-	-	-
106	267	265	2.00	2.20	2	2	2	2	2	3	-	-	-	-
107	265	267	2.60	2.17	2	2	2	2	2	2	-	-	-	-
108	262	261	-	0.20	-	-	-	0	0	0	-	-	-	-
109	262	264	2.37	3.00	2	3	3	3	3	2	-	-	-	-
110	264	268	2.22	2.20	2	2	2	2	2	2	-	-	-	-
111	269	264	-	-	-	-	-	-	-	-	-	-	-	-
112	285	263	1.80	-	2	2	2	-	-	-	-	-	-	-
113	273	269	2.90	2.33	3	3	3	3	2	2	-	-	-	-
114	272	264	2.71	2.40	3	3	1	2	2	1	-	-	-	-
115	273	269	-	2.00	-	-	-	2	3	1	-	-	-	-
116	262	258	2.50	1.60	2	2	2	1	1	1	-	-	-	-
117	259	260	2.25	1.80	2	2	1	1	2	2	-	-	-	-
118	282	272	3.00	3.80	3	3	3	3	4	4	-	-	-	-
119	257	255	2.00	2.22	2	2	2	2	1	2	-	-	-	-
120	270	265	-	-	-	-	-	-	-	-	-	-	-	-
121	266	267	-	2.20	-	-	-	2	1	2	-	-	-	-
122	264	264	2.00	2.60	2	2	2	2	2	2	-	-	-	-
123	272	268	2.44	2.60	2	2	3	2	2	2	-	-	-	-
124	272	267	3.30	2.60	3	3	3	3	2	3	-	-	-	-
125	265	261	-	2.00	-	-	-	2	1	1	-	-	-	-
126	269	265	-	2.80	-	-	-	3	2	3	-	-	-	-
127	274	270	2.00	3.00	2	2	2	3	3	2	-	-	-	-
128	270	268	3.40	3.67	3	3	3	4	4	3	-	-	-	-
129	270	268	2.50	3.00	2	3	3	3	3	3	-	-	-	-
130	277	265	-	1.40	-	-	-	1	1	2	-	-	-	-
131	266	260	1.87	1.60	2	2	2	1	0	2	-	-	-	-
132	272	267	3.80	3.00	4	4	4	4	3	3	-	-	-	-
133	274	267	2.50	2.50	2	2	3	2	3	3	-	-	-	-
134	257	264	2.40	1.83	2	2	3	2	1	3	-	-	-	-
135	270	262	2.33	2.00	2	2	1	2	1	2	-	-	-	-
136	273	263	-	2.00	-	-	-	2	1	2	-	-	-	-
137	272	268	2.00	2.00	2	2	2	2	1	2	-	-	-	-
138	273	270	2.66	3.00	3	3	3	3	3	2	-	-	-	-
139	262	266	3.10	3.33	3	3	3	4	3	4	-	-	-	-
140	262	264	3.00	2.60	3	3	3	3	3	2	-	-	-	-

(Table 45 continued next page)

Table 45--Continued

Subject	Total Help Items	Total Help Steps	Science 6/66	Spanish 6/66	Reading 6/66	A. & C. 6/66	Handwrtg. 6/66	Spelling 6/66	Music 6/66	Shop 6/66	Hmkng. 6/66	Science 1/67	Spanish 1/67	Reading 1/67	A. & C. 1/67	Music 1/67	Shop 1/67	Hmkng. 1/67
104	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
105	-	-	-	-	2	2	2	3	2	-	-	-	3	-	-	3	-	-
106	-	-	-	-	2	2	2	2	2	-	-	-	-	2	-	-	2	-
107	-	-	2	2	2	3	4	4	3	-	-	-	2	-	3	2	-	-
108	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	0	-
109	-	-	-	-	2	2	2	3	2	-	-	-	-	4	-	3	-	-
110	-	-	-	-	3	2	2	3	2	-	-	-	2	-	3	-	-	-
111	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
112	-	-	2	1	1	2	2	2	2	-	-	-	-	-	-	-	-	-
113	-	-	2	4	2	4	3	3	2	-	-	-	3	2	-	2	-	-
114	-	-	2	-	3	4	-	-	-	-	3	-	4	-	-	-	-	3
115	-	-	-	-	-	-	-	-	-	-	-	-	2	-	2	-	-	-
116	-	-	-	3	-	4	-	-	2	-	-	-	3	-	-	-	2	-
117	-	-	-	-	4	-	-	-	-	-	-	-	2	-	2	-	-	-
118	-	-	4	3	3	2	3	4	2	-	-	-	4	-	4	-	-	-
119	-	-	-	-	2	2	2	2	2	-	-	-	-	2	-	-	-	4
120	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
121	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	3
122	-	-	-	-	2	2	2	2	2	-	-	-	-	3	4	-	-	-
123	-	-	2	-	3	3	2	3	2	-	-	-	-	4	-	-	-	3
124	-	-	3	3	3	3	4	4	4	-	-	-	2	-	3	-	-	-
125	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	3
126	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	3
127	-	-	-	-	2	2	2	2	2	-	-	-	-	4	-	-	-	-
128	-	-	4	4	4	2	4	4	3	-	-	-	4	-	3	4	-	-
129	-	-	-	-	3	2	3	2	2	-	-	-	-	3	-	-	3	-
130	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	1	-
131	-	-	-	-	1	2	2	2	2	-	-	-	-	2	3	-	-	-
132	-	-	3	4	3	4	4	4	4	-	-	-	3	2	-	-	-	-
133	-	-	-	-	3	-	-	-	-	-	-	-	2	-	-	-	-	-
134	-	-	2	2	3	3	2	3	2	-	-	-	0	2	-	3	-	-
135	-	-	-	3	-	3	-	-	3	-	-	-	2	-	-	-	3	-
136	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
137	-	-	-	-	2	2	2	2	2	-	-	-	-	3	-	-	-	-
138	-	-	-	-	3	2	2	3	2	-	-	-	-	4	-	-	3	-
139	-	-	3	3	3	2	4	4	3	-	-	-	3	-	3	3	-	-
140	-	-	3	-	3	3	3	3	3	-	-	-	3	2	-	-	-	-

(Table 45 continued next page)

Table 45--Continued

Subject	Sex	Age (Mos.)	Condition	Examiner	PA 1st Admin.	PA 2nd Admin.	BD 1st Admin.	BD 2nd Admin.	Total 1st Admin.	Total 2nd Admin.	Total Score	Total BD Score	Total PA Score	SCAT (V)
141	2	155	1	3	7	9	8	3	15	12	27	11	16	255
142	2	154	1	4	11	13	10	12	21	25	46	22	24	261
143	2	157	1	3	10	8	10	12	20	20	40	22	18	263
144	1	152	1	4	8	10	7	7	15	17	32	14	18	265
145	1	149	1	2	10	14	12	12	22	26	48	24	24	269
146	2	166	1	3	10	9	6	8	16	17	33	14	19	258

(Table 45 continued next page)

Table 45--Continued

Subject	SCAT (Q)	SCAT (Total)	G.P.A. 6/66	G.P.A. 1/67	English 6/66	Soc. St. 6/66	Math. 6/66	English 1/67	Soc. St. 1/67	Math. 1/67	PA Help Items	PA Help Steps	BD Help Items	BD Help Steps
141	276	267	2.00	3.00	2	2	2	3	3	3	-	-	-	-
142	275	270	2.00	2.00	2	2	2	2	2	2	-	-	-	-
143	269	268	2.62	2.60	3	3	2	3	2	2	-	-	-	-
144	277	272	2.66	2.00	3	3	3	2	2	3	-	-	-	-
145	259	266	1.87	2.40	2	2	1	3	3	2	-	-	-	-
146	260	261	1.71	2.20	2	2	1	2	2	2	-	-	-	-

(Table 45 continued next page)

Table 45--Continued

Subject	Total Help Items	Total Help Steps	Science 6/66	Spanish 6/66	Reading 6/66	A. & C. 6/66	Handwrtg. 6/66	Spelling 6/66	Music 6/66	Shop 6/66	Hmkng. 6/66	Science 1/67	Spanish 1/67	Reading 1/67	A. & C. 1/67	Music 1/67	Shop 1/67	Hmkng. 1/67
141	-	-	-	-	2	2	2	2	2	-	-	-	3	-	-	-	-	3
142	-	-	-	-	2	2	2	2	2	-	-	-	-	2	-	-	-	2
143	-	-	-	-	4	2	2	3	2	-	-	-	3	-	-	3	-	-
144	-	-	-	-	2	-	2	3	-	-	-	-	2	-	1	-	-	-
145	-	-	-	-	2	2	2	2	2	-	-	-	2	-	-	-	2	-
146	-	-	0	2	2	-	-	3	-	-	-	-	-	3	2	-	-	-

Appendix M.--Grant Publication Reprint

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Perceptual and Motor Skills, 1966, 22, 612-614. © Southern Universities Press 1966

COMMENTS ON CIEUTAT'S "EXAMINER DIFFERENCES WITH THE STANFORD-BINET IQ"[1]

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Summary.—The methodological, sampling, and statistical problems encountered in Cieutat's (1965) study indicate that his findings cannot be accepted with confidence.

In a recent study reported in this Journal, Cieutat (1965) cited evidence which led him to conclude that *E*s differed in obtaining test results with the Stanford-Binet and that ". . . female *E*s elicited significantly higher IQs than male *E*s" (p. 317). However, the failure (a) to control certain critical variables (or to report whether certain controls were present), (b) to discuss the implications of the sampling procedures, and (c) to analyze the data with appropriate statistical techniques (or to report in detail the methodological and statistical techniques) suggests that the findings must be questioned.

The critical variables in the experiment center, in part, on race of *S*s and *E*s and *E*s' experience. With regard to the race variable, *S*s were Negro but *E*s' race was not indicated (Editors' correspondence indicated that all *E*s were Caucasian). It is necessary to know both *S*s' and *E*s' race because evidence is available indicating that *E*'s race is an important variable in intelligence testing, especially when *S*s are Negro (e.g., see Canady, 1936; Pasamanick & Knobloch, 1955). Concerning the experience variable, differential status among *E*s was present and possibly test proficiency differed among *E*s. For example, four *E*s held the doctorate while the remaining nine *E*s did not; one *E* tested as many as 79 *S*s, while others tested fewer than 10 *S*s. While the effect of the possible differential experience among *E*s in Cieutat's study is not known, a study by La Crosse (1964) indicates that *E*'s experience affects intelligence test results with Negro *S*s. Thus, any conclusions should clearly indicate that they apply to situations in which *S*s are Negro and *E*s are white. The failure to control for the experience variable limits any meaningful interpretations of the results.

A number of possibilities may account for the total mean IQ (86.52) being in the below-average range. First, the mean adequately reflects the *S* population. Second, the sample was representative and through administering and scoring the test, *E*s depressed *S*s' IQs to the below-average range. Third, the sample was nonrepresentative. Concerning the last possibility, data are available which indicate that Negro *S*s in the 4- to 5-yr. age level achieve mean Stanford-Binet IQs in the average range (e.g., Brown, 1944; Lacy, 1926). None of the studies reviewed by Shuey (1958) found mean Stanford-Binet IQs to be in the below-average range for preschool and kindergarten *S*s. Moreover, Anastasi

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[1] The article reported herein was performed pursuant to Research Project OE 5-10-429 supported by the United States Department of Health, Education and Welfare, Office of Education, under the provisions of the Cooperative Research Program.

(1958) writes: "Psychological tests administered at the *infant and preschool level* have in general revealed no significant difference between Negroes and whites in over-all behavioral development" (p. 598). Thus, while Cieutat's data do not permit a definitive answer to the question of the representativeness of the sample, generalizing the results to *Es'* testing populations composed of either (a) white *Ss* or (b) Negro *Ss* with average or above-average ability is difficult because the former group was not in the sample and the latter group is not adequately represented.

The methodological and statistical difficulties concern the design of the experiment, the limited information provided for interpreting the 2 × 2 analysis of variance design, and the incorrect procedures used in analyzing the results. With respect to the design of the study, it is not known whether *Ss* were randomly assigned to *Es*. If random assignment was not present, then it is possible that some *Es* were assigned dull *Ss* while others were assigned bright *Ss*, or that other unknown selective factors were operating in the assignment of *Ss*. Concluding that *Es* differ in their obtained test results would be dubious unless random assignment was utilized.

After the one-way analysis of variance was completed, *t* tests were used to examine *E* differences. Clearly, for *post hoc* analyses in an analysis of variance design, *t* tests are inappropriate (cf., Winer, 1962). A multiple range comparison, such as that described by either Duncan, Newman-Keuls, Tukey, or Scheffé, was needed to evaluate clusters of significant mean differences. The second analysis of variance design (a 2 × 2) examined sex differences for both *Ss* and *Es*. This design is not adequate because the same *E* tested both male and female *Ss* and thus nonindependence existed in the cells containing data for sex of *S* by *E*. Again, for *post hoc* comparisons in the second design, *t* tests were not appropriate.

In order for the 2 × 2 analysis of variance to give an unbiased estimate of the interaction a rather difficult assumption would have to be made, namely, that each *E* is equally or proportionately represented in the two cells appropriate to his sex. Inspection and chi square analysis of the raw data indicate that some cells had significantly different proportions. A nested analysis of variance design illustrated below is, however, a design which provides for the evaluation of individual *E* differences within each *E*'s sex, *E* sex differences, *S* sex differences, and interaction effects due to *Es'* sex and *Ss'* sex (cf., Winer, 1962, p. 186).

	Male *Es*					Female *Es*				
	E_1	E_2	E_3	E_4	E_5	E_6	E_7	E_8	E_9	E_{10}
Male *Ss*	n	n	n	n	n	n	n	n	n	n
Female *Ss*	n	n	n	n	n	n	n	n	n	n

In conclusion, Cieutat's (1965) results cannot be accepted with confidence and must be considered tentative at best. However, the writer does agree with

Cieutat that additional experimental investigation concerning *Es'* influences on intelligence test performance is needed.

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Appendix N.--Grant Publication Reprint

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STATISTICAL REANALYSIS OF CANADY'S "THE EFFECT OF 'RAPPORT' ON THE I. Q.: A NEW APPROACH TO THE PROBLEM OF RACIAL PSYCHOLOGY"[1,2]

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Summary.—Because of the divergent interpretations of Canady's (1936) study, "The Effect of 'Rapport' on the I. Q.: a New Approach to the Problem of Racial Psychology," a statistical reanalysis was performed. Results indicate that on the first administration of the 1916 Stanford-Binet, *Ss* obtained higher IQs with *Es* of their own race, while on the second administration, *Ss* obtained higher IQs with *Es* of the other race. For the total group, the Negro-white *E* order of administering the tests led to higher IQs than the white-Negro *E* order. *Es*' sequence of administering the test, however, did not significantly interact with *Ss*' race in determining inter-administration improvement. Results should be accepted with caution because of the methodological difficulties in the design of the experiment.

Canady's (1936) publication, almost a classic in its area, has been cited as both supporting and refuting the position that *Es*' race affects the intelligence test scores of Negro *Ss*. Anastasi (1958) refers to Canady's study in illustrating the influence of *Es*' race on the intelligence test scores of Negro *Ss*. On the other hand, Tyler (1956) writes that Canady's results do not warrant the conclusion that *Es*' race is an important variable. While not directly referring to Canady's work in discussing the effect of rapport on the results of intelligence tests, Shuey (1958) concludes from the studies surveyed by her (including Canady's) that no evidence exists "that the race of the examiner materially affected the testing *rapport*" (p. 316). The divergent interpretations of Canady's study can be resolved by reference to the statistical analyses reported herein.

Ss in Canady's study were 48 Negroes, 27 male and 21 female, and 25 white males. The age range in each racial group was from 4 to 16 yr. *Ss* were attending schools in Evanston, Illinois. The 1916 Stanford-Binet was administered on two occasions, with the second test administration occurring within a 1-yr. period following the first administration. *Es* were 1 Negro and 20 white students working in a university clinic who had at least one course in intelligence testing.

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[2] Tables showing means and variances and analyses of variance may be obtained from the American Documentation Institute. Order Document No. 9178 from ADI Auxiliary Publications Project, Photoduplication Service, Library of Congress, Washington, D. C. 20540. Remit in advance $1.25 for 35-mm. microfilm or photocopies and make checks payable to: Chief, Photoduplication Service, Library of Congress.

RESULTS

Three separate analyses of variance, based upon Canady's (1936) published data, are reported. Because of the unequal group size, the first analysis of variance employed the unweighted-means solution presented by Winer (1962, pp. 374-378), while the second and third analyses employed the unweighted-means analysis (Winer, 1962, pp. 222-224). The first analysis was a three-factor analysis with repeated measures on one factor (Winer, 1962, p. 337). *Ss'* race and the sequence of *Es* administering the test (Negro followed by white and white followed by Negro) were the two independent factors, while the repeated factor was the two test administrations to the same *S*. *F* tests revealed that only the two independent factors were significant: *Ss'* race ($F = 68.41$, $df = 1/69$, $p < .001$) and *Es'* sequence ($F = 4.77$, $df = 1/69$, $p < .05$). White *Ss* achieved higher IQs and the Negro-white *E* order of test administration led to higher IQs than the white-Negro *E* order.

The second analysis, a 2 × 2 factorial analysis of variance, examined the effects of *Ss'* and *Es'* race on the first test administration only. White *Ss* achieved higher IQs ($F = 28.47$, $df = 1/69$, $p < .001$), *Es'* race was not significant ($F = 1.72$, $df = 1/69$, $p > .05$), and the interaction was significant ($F = 9.31$, $df = 1/69$, $p < .01$). The significant interaction indicates that the effect of *Es'* race upon IQ differs—Negro and white *Ss* performed in different ways, i.e., *Ss* obtained higher IQs when tested by *Es* of their own race.

Considering data from the second test administration only, the third analysis—a 2 × 2 factorial analysis of variance—revealed results parallel to those of the second analysis: white *Ss* achieved higher IQs ($F = 24.12$, $df = 1/69$, $p < .001$), *Es'* race was not significant ($F = 2.28$, $df = 1/69$, $p > .05$), and the interaction was significant ($F = 5.06$, $df = 1/69$, $p < .01$). The latter interaction, in contrast to the interaction in the first administration, indicates that *Ss* obtained higher IQs when tested by *Es* of the other race.

DISCUSSION AND CONCLUSION

Canady's data indicate that, within each separate test administration, *Es'* race interacts with *Ss'* race and that the *E* order of administering the tests is important. However, it is difficult to interpret these findings. Why the Negro-white *E* order led to higher scores for the total group of *Ss* is not clear. Similarly, it is not apparent why *Ss* performed *better* with *Es* of their own race on the first administration and *more poorly* with *Es* of their own race on the second administration. The factors operating to account for the significant results are unknown.

The results indicating that white *Ss* achieved higher scores than Negro *Ss* are similar to those reported by other investigators (e.g., see Anastasi, 1958; Tyler, 1956). If one is interested in the changes occurring between the first and second test administrations in relation to *Es'* and *Ss'* race, then *Es'* sequence of administering the test does not significantly interact with *Ss*' race in determining inter-administration improvement.

A number of methodological and sampling problems exist. *E* population consisted of 20 whites and only one Negro. It is not known whether *Ss* were randomly assigned to *Es*. Under one sequence of *Es*, white *Ss* scored in the superior range and thus some of the sample may not have been representative. In view of these difficulties, the results must be accepted with caution.

Since Canady's work was published, a few studies have appeared evaluating *Es*' race as a variable in intelligence testing. Pasamanick and Knobloch (1955) reported that 2-yr.-old Negro *Ss*, when examined by a white *E* with the Gesell Developmental Examination, had lower verbal responsiveness scores than other verbal scores. La Crosse (1964) found that on a repeated administration of the Stanford-Binet Intelligence Scale (Form L-M) white *Es* did not significantly depress Negro *Ss*' IQs when *Ss* were previously examined by Negro *Es*. These results are similar to those reported in the present article. Because La Crosse (1964) employed white and Negro *Es* testing *Ss* of their same race on the first test administration, her study does not bear upon the question of the effect of *Es*' race on IQs measured during an initial test administration. On the Stanford-Binet, Forms L and M, Forrester and Klaus (1964) reported that Negro kindergarten *Ss* achieved higher IQs when examined by a Negro *E* than when examined by a white *E*. Like Canady (1936) and La Crosse (1964), a nonsignificant interaction was found between *Es*' race and test administrations.

Katz, *et al.* (1965) found that Negro *Ss*' performance on a digit symbol test was better under a white than a Negro *E* when the instructions emphasized that the test measured motor ability. However, *Es*' race was not a significant factor when the instructions indicated that intellectual ability was being measured. White *Ss* were not studied by Katz, *et al.* (1965). Sattler and Theye (1966), in a review of studies concerning individually administered intelligence tests, concluded that the evidence is only suggestive that white *Es* may have some subtle deleterious effect on Negro *Ss*' scores. Canady's study, performed in 1928 and published in 1936, still remains unreplicated. Repetition of his experiment utilizing methodological and sampling controls is needed as well as additional studies directed to evaluating the effect of *Es*' race on intelligence test scores. Canady deserves credit for being a pioneer in an area worthy of further attention.

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Modifications in intelligence testing
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Predictive validity of intelligence test scores
IQ and grades
IQ and School and College Ability Test scores
Block Design and Picture Arrangement subtests

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Wechsler Intelligence Tests

ABSTRACT

The effects of alterations in test procedure upon the original and repeated test performance of average ability adolescents was studied using two Wechsler subtests. Block Design (BD) was administered to 170 subjects in the first experiment, while 146 subjects received both BD and Picture Arrangement (PA) in the second experiment. In both experiments significantly higher scores were obtained on the repeated administration. In the first experiment neither the help administered nor the type of cue significantly affected performance, while in the second experiment a series of cues significantly raised scores. The examiner and sex of subject variables were not significant in affecting subtest scores. Test form order and subtest order were significant factors. Intercorrelations among the variables indicated that the predictive validity of the subtest scores using grades as criteria is not high. BD is, however, a good predictor of grade point average and School and College Ability Test scores, while PA is less effective. Significant negative correlations appeared between age and grades, but not between age and subtest scores. The best predictor of grades is the score on the intelligence test obtained under standard administrative procedures. Subtests had inadequate ceilings for approximately 25% of the initial group of subjects tested.

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